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ABSTRACT

These hearings addressed proposed Bill S. 2104 to create a Department of Energy (DOE) fellowship program for math and science teachers that would provide them opportunities to work at DOE labs in order to enhance coordination and communication among the educational community, the Congress, and the Executive Agencies responsible for developing and administering federal education programs. Following opening statements by Senators Wendell H. Ford and Mark O. Hatfield, Terry Cornwell Rumsey of the Department of Education testified on the Department's philosophy and strategies to address national education goals and in particular how S. 2104 would fit in with these and with existing programs. James A. Tegnelia of Sandia National Laboratories testified that S. 2104 would be helpful, would result in tangible improvement in DOE educational outreach programs, and should encourage participation of rural and minority school teachers. John M. Fowler of the Coalition for Science and Technology Education testified on the beginnings of the program that led to S. 2104. (It brought teachers on fellowships to work in Congressional offices and to contribute their insights into educational legislation and policymaking.) Senator Pete V. Domenici offered remarks on the importance of the proposed program. A brief discussion followed concerning similar programs at DOE, the best length for fellowships, program costs, and requirements for participants. The document contains a list and descriptions of DOE minority education programs and appendixes with response to additional questions, and additional material submitted for the record. (JB)

SP

S. HRG. 103-682

ALBERT EINSTEIN DISTINGUISHED EDUCATOR FELLOWSHIP ACT OF 1994

ED 382 604

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY RESEARCH AND DEVELOPMENT

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

ONE HUNDRED THIRD CONGRESS

SECOND SESSION

ON

S. 2104

TO ESTABLISH WITHIN THE NATIONAL LABORATORIES OF THE DEPARTMENT OF ENERGY A NATIONAL ALBERT EINSTEIN DISTINGUISHED EDUCATOR FELLOWSHIP PROGRAM

JUNE 28, 1994

U.S. DEPARTMENT OF EDUCATION
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ALBERT EINSTEIN DISTINGUISHED EDUCATOR FELLOWSHIP ACT OF 1994

TUESDAY, JUNE 28, 1994

U.S. SENATE,
SUBCOMMITTEE ON ENERGY
RESEARCH AND DEVELOPMENT,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:32 a.m., in room SD–366, Dirksen Senate Office Building, Hon. Wendell H. Ford, presiding.

OPENING STATEMENT OF HON. WENDELL H. FORD, U.S. SENATOR FROM KENTUCKY

Senator FORD. Good morning, ladies and gentlemen. Today we will receive testimony on S. 2104. This bill would create a Department of Energy fellowship program for math and science teachers. The program would provide school teachers a chance to work at DOE labs. S. 2104 was introduced on May 11 by my distinguished colleague from Oregon, Senator Hatfield, along with Senator Domenici, Senator Bingaman, and Senator Cochran.

Scientific education has always been a big part of DOE's mission. This is because the Department needs trained scientists to carry out its work. It employs some 60,000 scientists, engineers, and technicians at its labs. As a result, DOE is one of the biggest supporters of science education programs. In fiscal year 1995, DOE plans to spend over $140 million on science education. A third of this will support pre-college programs at both grade schools and high schools.

Two DOE programs, the TRAC program and the Laboratory Teacher Training Program, are similar to the one called for in this bill. The TRAC program gives 7th through 12th grade teachers a chance to work at DOE labs for the summer. The Laboratory Teacher Training Program helps teachers develop new ideas for the classroom. While this program is run by DOE, it is supported by NASA, EPA, the Department of Commerce, the Department of Agriculture, and the Department of Interior.

This year DOE, along with NASA and NIH, are supporting the Albert Einstein Congressional Fellowship Program. This program was started in 1990. The program places math or science teachers into congressional offices. It has been a good program. It has brought a little reality to us here in Congress. Senator Hatfield got this program going and I thank him for getting it started.

The purpose of the hearing today is to learn more about these fellowship programs and how the program called for in S. 2104 might fit into them.

The witnesses gathered here today are very distinguished and I am honored to have all three.

Senator Hatfield, do you have a statement you would like to make before we start with the witnesses?

STATEMENT OF HON. MARK O. HATFIELD, U.S. SENATOR FROM OREGON

Senator HATFIELD. Thank you, Mr. Chairman. I would put my statement in the record and merely just highlight a couple of points.

Mr. Chairman, you will recall that we have already authorized this program through the Rules Committee, which you Chair and which I am privileged to serve with you.

I would like to just indicate briefly that in 1990 I introduced a resolution calling for the placing of teachers on the firing line in the secondary schools and in our congressional offices to help us to keep the linkage between what we are creating as policy and into the classroom so that the teacher who is going to implement much of our policy in not only math/science, but in many other areas as well would have an input at a time when we would really need that kind of perspective. I think that that has been proven to be very helpful in Senator Bingaman's, Senator Cochran's, Senator Kennedy's, and my own experience as well over these last couple of years.

This attempts to recognize that the same would apply and could apply to the agencies dealing with educational programs in science and math. So, in this bill this year we are trying to stabilize the program and also to expand it where there would be two fellows in the Senate, two in the House, and five in various Federal agencies.

So, I too would like to welcome our panel of experts. I am looking forward to hearing their testimony, and at this point I would put my full statement in the record.

Senator FORD. Without objection, the statement will be included in the record in full.

[The prepared statement of Senator Hatfield follows:]

PREPARED STATEMENT OF HON. MARK O. HATFIELD, U.S. SENATOR FROM OREGON

Mr. Chairman, I would like to take this opportunity to thank Chairman Ford for scheduling this hearing. The Chairman may recall that Einstein resolutions have previously passed the Rules Committee on which we both sit. I would also like to thank the panel for taking the time to be here to testify on a matter that is close to my heart.

I have been deeply involved in the issue of bringing outstanding math and science teachers into the Federal government on fellowships since 1990. At that time, I introduced a resolution to bring four such Fellows to Congress for the 1990-91 academic year. Through a combination of Congressional resolutions, private funding and grants from agencies, the program has been continued and twelve fellowships have been awarded during the past four years. All of these treasured teachers have worked in Congress.

I can personally attest to the service that these Fellows can render a Congressional office. Their perspective from the classroom is unique and valuable. They focus in on what will make a difference in the classroom and what will not. Senators

Bingaman, Cochran and Kennedy can offer similar testimony to the insight and service these teachers have provided.

In addition, the feedback that we get from these professionals following their time in Washington indicates that their interest and confidence in working at a policy making or advisory level has been raised. Some serve on advisory councils to governors and state departments of education. Others have become more involved in science and math teacher organizations. This is in addition to the programs that they put on for their students concerning their fellowship year. At least one has compiled materials on Federal education programs for other teachers, and some even teach government classes.

Another component of the Federal government needs to be addressed. A number of Federal departments and agencies have programs related to math and science education. It is my belief that these agencies can benefit from the presence of the Fellows as much as the Congress has. For that reason, I introduced in the 102nd Congress a version of this bill that placed two Fellows in the Senate, two in the House, and five in various Federal agencies. My intent was to provide statutory stability to the program as well as expand it. That is where my interest still lies.

I look forward to hearing your testimony.

Senator FORD. The witnesses, so they may be identified for the record, are Ms. Terry Cornwell Rumsey, Director, Office of Science Education and Technical Information, U.S. Department of Energy; Dr. James A. Tegnelia——

Dr. TEGNELIA. Yes, sir.

Senator FORD. I have a good one. You know, Ford is everywhere.

[Laughter.]

Senator FORD. Executive Vice President and Deputy Director of Sandia National Laboratories, Albuquerque, New Mexico; and Dr. John Fowler, Executive Director, Triangle Coalition for Science and Technology Education, College Park, Maryland.

Ms. Rumsey, if you would like to start, we would be delighted to hear you. If you want to put your full statement in the record, we would be glad to. You can highlight it. A little word about highlighting: people get carried away sometimes and do not stick to the script.

Senator HATFIELD. And it is longer.

Senator FORD. It is longer than the written statement.

[Laughter.]

STATEMENT OF TERRY CORNWELL RUMSEY, DIRECTOR, OFFICE OF SCIENCE EDUCATION AND TECHNICAL INFORMATION, DEPARTMENT OF ENERGY

Ms. RUMSEY. Honorable Chairman and members of the subcommittee, I would like to thank Chairman Ford for inviting me to testify before the Energy and Natural Resources Subcommittee on Research and Development. My testimony today will address the letter from Senator Johnston requesting the Department of Energy's views on S. 2104, a bill to establish within the Department of Energy national laboratories a national Albert Einstein Distinguished Educator Fellowship Program.

In the interest of time, I have prepared a summary statement for the hearing this morning, but I would ask that my full statement be included in the record.

Senator FORD. Without objection, your total statement will be included in the record as if given.

Ms. RUMSEY. Thank you.

The full statement includes the Department's education philosophies and strategies to address the national education goals.

The Department of Energy has a long tradition of support for mathematics and science education at all levels, pre-college through post-graduate. The Department's newly issued strategic plan includes a renewed commitment for supporting science education as one of the key elements in ensuring future scientific and technical leadership for global economic competitiveness. The strategic plan also calls for the Department to provide for a well-trained and diverse work force for both the Department and the Nation by enhancing the scientific and technical literacy of both youth and adults on energy and environmental issues.

The Office of Science Education and Technical Information is responsible for overall coordination and policy direction of the Department's involvement in science education across all departmental missions and programs. The office has developed a new strategic plan for the support of science education which is closely linked to the national education goals. Collectively, the Department's science education programs reach over 1 million students, teachers, and members of the general public each year. I am providing members of the committee with copies of the recently published Education Programs Catalog which summarizes the Department's various science education programs.

With respect to S. 2104, I offer the following comments: The Department supports the basic intent of S. 2104 and indeed has had substantial experience in managing similar programs under our existing legislative authority. We believe S. 2104 would be complementary to our existing teacher development programs like the Teacher Research Associates Program, TRAC, an 8-week summer research assignment for approximately 400 middle and high school level mathematics and science teachers each year.

It also uses the master teacher concept. Master teachers are an invaluable resource in sharing their experiences with other teachers in their schools and districts. They help create a home-based environment that supports and encourages the use of new skills and techniques to improve the quality of science and math education.

I would like to share with you the experience of one such teacher. Pat Franzen, a middle school teacher, was accepted into the 1990 summer science project at Fermilab. Her collaborative style, boundless energy, and inquisitive mind caught the attention of the Education Office staff, and Pat was invited to participate in the development of the Particles and Prairies instructional materials and multi-media program. This program has received *Envision* magazine's highest award for a multi-media program and the Gold Award for educational programs using multi-media.

Pat's confidence and leadership ability have grown and now she presents regional and national in-service workshops. In 1993 her knowledge of the prairie led to her appointment as a teacher research associate. She continued her research project even after the TRAC program had concluded. Her research effort has been of interest to scientists who study insects statewide. In 1993 she was nominated for the Presidential Award in Science Teaching and has received the Award of Excellence from the Illinois Science Teachers Association. This anecdote is reflective of the impact and success of the Department of Energy teacher development programs.

The Office of Science Education and Technical Information has also developed an evaluation plan for the TRAC program. The evaluation plan includes elements of program design, program implementation, teacher selection, and assessment which could readily be adapted to S. 2104.

The second teacher development initiative I would like to mention is the Interagency Summer Teacher Enhancement Program, or STEP. This program is administered by the Department of Energy on behalf of the National Science and Technology Council's Committee on Education and Training, and as such is an example of the Department's capability in administering cross-agency education programs.

Participating agencies have included the Department of Energy, the Environmental Protection Agency, the National Aeronautics and Space Administration, the Department of Agriculture, the Department of the Interior, the Department of Commerce, the Smithsonian Institution, and the National Science Foundation. NSF has also conducted a formal external evaluation of the program.

The STEP program brings science teachers across the country into Federal laboratories. They participate in an intensive 4-week summer workshop. They learn science using state-of-the-art technology specific to that particular Federal laboratory.

The benefits of participating in STEP continue well into the school year. Teachers attend workshops that help them translate their summer experiences into classroom instruction. This includes help with lesson plans, experiments, and hands-on demonstrations.

Another value of the STEP program is teachers develop new teaching approaches and techniques. Students are the beneficiaries of the teachers' enhanced instructional abilities. It is not only students of participating teachers that reap the benefits. In many STEP programs, participants agree to conduct workshops for other faculty members both in their own schools, as well as throughout their school systems and districts.

Of all the different types of science education programs, teacher development programs have the greatest potential for reaching the largest number of students. Consider the following:

High school teachers have 100 to 150 students per year. This equates to about 4,000 to 5,000 students over a 30-year period. Middle school teachers reach 150 students per year, or about 4,500 over an academic career, and typical elementary school teachers have 20 to 25 students per year, or about 1,000 in a career. Elementary level math and science resource teachers serve 75 to 100 students per year, or about 2,250 in a career.

Teacher development programs have tremendous impact by giving teachers the tools necessary to excite youngsters about math and science.

In conclusion, the Department oversees an unparalleled collection of scientific and technical facilities and equipment with extraordinary potential for kindling a sense of excitement about science and for increasing public science literacy. The Department has substantial capacity and experience in not only managing a wide variety of science education programs, but also in partnering with other Federal agencies and private sector organizations.

I have provided you with just a sample of these departmental programs. The Education Programs Catalog, as I noted at the outset of my testimony, provides additional information on the programs sponsored by the Department. In a perfect world with unlimited resources, we would fund every good idea, but in the real world of diminishing resources, we are forced to make hard choices based on a rationale that delivers results.

The action strategies we apply include the critical role of teacher development recognizing that teachers must be confident and competent in order to encourage youngsters to excel in math and science. Teachers should also be able to understand the key concepts of science. They should model qualities they would like their students to possess, such as curiosity and enthusiasm, and they should be able to assess the development of understanding.

The Department's teacher development programs are built upon these central principles. The bill, S. 2104, would be implemented along these same lines.

We would recommend that the implementation of the bill include linking participation of the selected teachers into science and math education systemic reform efforts in local school districts. In accordance with the Department of Energy's strategic plan, we would encourage the school district to provide either financial or resource support for in-service teacher training to be conducted by the Einstein fellow at the conclusion of his or her 1-year fellowship.

This concludes my testimony. I would be pleased to answer any questions members might have on any or all of our science education programs. Thank you.

[The prepared statement of Ms. Rumsey follows:]

PREPARED STATEMENT OF TERRY CORNWELL RUMSEY, DIRECTOR, OFFICE OF SCIENCE EDUCATION AND TECHNICAL INFORMATION, DEPARTMENT OF ENERGY

Honorable Chairman and Members of the Subcommittee, I want to thank Chairman Ford for inviting me to testify before the Energy and Natural Resources Subcommittee on Research and Development. My testimony today will address the letter from Senator Johnston requesting Department of Energy views on S. 2104, a bill to establish within the National Laboratories of the Department of Energy a national Albert Einstein Distinguished Educator Fellowship Program.

The Department of Energy (DOE) has a long tradition of support for mathematics and science education at all levels of education—precollege through postgraduate. The Department's newly issued strategic plan includes a renewed commitment for supporting science education as one of the key elements in ensuring future scientific and technical leadership for continued economic competitiveness. The strategic plan also calls for the Department to help provide a technically trained and diverse workforce for both the Department and the Nation by enhancing scientific and technical literacy of both youth and adults on energy and environmental issues.

The Office of Science Education and Technical Information is responsible for overall Coordination and policy direction of the Department's involvement in science education at all levels of education and across all Departmental missions and programs. The Office has developed a new strategic plan for the support of science education which is closely linked to the National Education Goals. Collectively, the Department's science education programs reach over 1 million students, teachers, and members of the general public each year. I am providing Members of the Committee with copies of the recently published *Education Programs Catalog* which summarizes the Department's various science education programs.

With respect to S. 2104 I offer the following comments:

The Department supports the basic intent of S. 2104 and indeed has had substantial experience in managing similar programs. The Department has existing legislative authority to carry our programs similar to S. 2104. This existing authority includes:

The 1977 DOE Organization Act which authorizes education and training activities necessary to ensure that the Nation has an adequate technical work force in energy-related research and production fields.

The DOE Science Education Enhancement Act (part of the 1991 National Defense Authorization Act) expands the Department's authorization to support science education at all levels, including public understanding of science, and amends the 1977 legislation to make support for science education a major mission of the Department.

We believe the bill would be complementary with our existing Teacher Research Associates Program (TRAC), which also emphasizes the Master Teacher concept. Master Teachers are an invaluable resource in providing the benefit of their experiences to other teachers in their schools and districts. They help provide a home-based environment that supports and encourages the use of new skills and experiences.

We have developed an evaluation plan for the TRAC program, which includes the elements for program design, program implementation, teacher selection, and assessment which could be readily adapted to support the Einstein Program. I will describe the TRAC program in more detail later in my testimony.

We would also recommend that the implementation S. 2104 include linking the participation of the selected teachers to the systemic reform of local school districts. In accordance with the DOE strategic plan, we would encourage the school district to provide financial or resource support for in-service teacher training to be conducted by the Einstein Fellow at the conclusion of his/her one year fellowship. We further recommend that the bill clarify that the fellows would not be federal employees.

LEARNING CONTINUUM

I would now like to briefly discuss the Department's science education philosophy and strategies and summarize several of our major science education programs and initiatives which we believe complement the intent of the Einstein legislation. The Office of Science Education and Technical Information has two basic goals in supporting mathematics and science education as illustrated by Exhibit I, the Learning Continuum.

Our first goal is to ensure that the Department's own staffing needs are met and are fully representative of our Nation's diverse population. Until the late-1980's, the primary focus of the DOE education programs was on encouraging university students to pursue careers in the DOE-related scientific and technical areas through student scholarships and research appointments at DOE facilities. Research appointments were in fields that included mathematics, physics, geology, chemistry, zoology, biology, and other areas of basic and applied research.

Our second goal is to do our part to achieve a high level of a scientifically and technically literate citizenry. We have exciting strategies like the Science Museum programs which provide hands on, direct experiences with scientific phenomenon designed to stimulate interest in and awareness of scientific and technical concepts. Since 1989, the Department's science education mission has been significantly expanded to include programs directed at reaching students earlier in the education pipeline as well as programs specifically developed to increase science literacy. The Department's strategy in precollege science education support is based on five premises:

Serious efforts to produce students with excellent mathematics and science skills must begin at the elementary school level and reach all students;

Science and mathematics teachers must become full partners in the scientific community;

Programs must encourage full participation to individuals traditionally underrepresented in mathematics, science, engineering, and technology;

DOE must more fully utilize its unique regional scientific facilities and staff to help improve mathematics and science education;

DOE's efforts must be totally integrated with those of other Federal agencies, the States, and private sector to yield the greatest benefit for the Nation.

We will also position ourselves to support the Administration's major commitment to technical training, ensuring a smoother transition from school-to-work, and support programs that provide for the retraining of workers displaced as a result of the end of the Cold War. Beginning in 1995 DOE's education programs will be expanded with a new focus on community colleges and vocational schools, where critical technical skills are taught. We will help to ensure that all students possess a passion for continuous learning, whether on the job or in higher education and are equipped

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to more easily adapt to rapidly changing job requirements and future employment needs, and to assure the pipeline for future scientists and engineers.

ACTION STRATEGIES

In a perfect world of unlimited resources, we would fund every good idea. But, in the real world of diminishing resources, we are forced to make hard choices based on a rationale that delivers results. We use action strategies (see Exhibit II), to apply this new thinking to our current programs, as well as to make decisions on new proposals. I would like to highlight several of these action strategies and summarize several of the programs which support the strategies.

One of our central action strategies is the critical role of Teacher Development. This strategy recognizes that teachers must be confident and competent in order to excite youngsters about math and science. We have to give teachers the tools and the resources necessary to meet these needs through Teacher Development programs.

The Department currently sponsors three distinct Teacher Development programs. These are:

The Teacher Research Associates Program (TRAC) is a leading-edge initiative which was pioneered at the Pacific Northwest and Lawrence Berkeley Laboratories focuses on providing hands-on research experiences for precollege science and math teachers. TRAC is a national program which provides summer research opportunities at several DOE National Laboratories and technology centers for approximately 380 middle and high school level mathematics, science and technology teachers per year. Teachers are either nominated by their respective State Departments of Education or apply independently and are selected by a committee comprised of representatives from the participating laboratories and the Department of Energy.

The teachers who are selected are offered an 8-week research assignment. The teachers are paired with a DOE scientist and serve on research teams, where most of their time is spent improving research skills and laboratory techniques. Most of the participants also prepare instructional materials and experiments to take back to their classrooms.

This program increases teacher awareness and understanding of current science and technology and promotes transfer of new knowledge to the classroom.

There is a formal evaluation component that includes a pre-experience questionnaire; questionnaire/interview with all TRAC site directors during the program; exit survey of all TRAC participants; survey of mentor scientists; survey of school principals, and a follow-up questionnaire nearly a year after the experience. Participants have described the impact of this programs as follows: 80% feel more confident in supervising research projects, 75% use program materials in their classes; over 70% added topics to the subjects they teach; and over 80% made major changes in teaching their classes. Other outcomes include the development of curriculum materials and models, and the cross-training that takes place when teachers share classroom strategies.

I would like to share with you some of the success stories of teachers who have participated in our TRAC program.

> Patricia Franzen, a middle school teacher, was accepted into the 1990 Summer Science Project at Fermilab. Her collaborative style, boundless energy and questioning mind caught the attention of the Education Office staff, and Pat was invited to participate in the development of the 'Particles and Prairies' instructional materials and multimedia program. This program has received *Envision* magazine's highest award for a multimedia program and the Gold award for educational multimedia. Pat's confidence and leadership ability have grown, and she now confidently presents teacher regional and national inservice workshops. In 1993 her knowledge of the prairie directly led to her appointment as a Teacher Research Associate. She continued her research project even after the TRAC program was concluded and accomplished an unprecedented research effort which has been of interest entomologists statewide. Her efforts have not gone unnoticed. In 1993, she was nominated for the Presidential Award in Science Teaching and received the Award of Excellence from the Illinois Science Teachers Association.

Edwin Christmann, electronics engineering high school teacher, Norfolk, Virginia: "There can be no question that the TRAC program at the Continuous Electron Beam Accelerator Facility (CEBAF) will influence the way I teach. For instance, I will be able to assimilate the technology and information that was gained to the courses that I teach. Things that I never had a clear understanding of such as gluons and quarks will be transferred more efficiently into lectures on atomic structure."

Keith Olive's research in the Pacific Northwest Laboratory TRAC Program expanded a new field—paleoclimatology or estimating climate conditions 6,000 years ago. This is done by studying mussel fossils for various growth rates. Keith has linked up via computer over 100 schools nationwide toexchange information on this new field of research.

The second Teacher Development initiative currently supported by the Department is the Interagency Summer Teacher Enhancement Program (STEP). This program is administered by DOE on behalf of the National Science and Technology (NSTC) Committee on Education and Training (CET) and as such is an example of the Department's capabilities in administering cross-agency education programs.

The STEP Program brings science teachers across the country to Federal Laboratories to participate in intensive four-week summer institutes on state-of-the-art science in specific content or thematic areas.

The STEP experience extends well into the school year, as teachers attend workshops that help them translate their summer experiences into classroom instruction. This includes help with lesson plans, experiments, and demonstrations. Furthermore, the teachers learn about and cultivate new teaching approaches and ideas through their participation, which enhances their instruction abilities and the education of their students. It is not only students of participating teachers that reap the benefits; in many STEP programs participants agree to conduct workshops for other faculty members, not only in their own schools, but throughout their school systems and districts. Approximately 500 teachers receive this intensive training each year at Federal laboratories and facilities around the country.

Participating agencies have included the Department of Energy, Environmental Protection Agency, National Aeronautics and Space Administration, Department of Agriculture, and the Department of the Interior, the Department of Commerce, the Smithsonian Institution, and the National Science Foundation, which also has conducted a formal external evaluation.

DOE laboratories and facilities hosting these institutes include Argonne National Laboratory, Lawrence Berkeley Laboratory, Continuous Electron Beam Accelerator Facility, Fermilab, Los Alamos National Laboratory, National Institute for Petroleum and Energy Research, Oak Ridge Institute for Science and Education, and Pacific Northwest Laboratory. Program topics include materials science, physics, environmental science, space, the oceans, earth, and agricultural science. In addition, each of the participating laboratories is required to complete a teacher development template to help them evaluate and improve their program.

The third DOE teacher development initiative are a series of Regional Teacher Development Programs which take place at the Department's National Laboratories and other research facilities. Each DOE laboratory and facility conducts its own regionally-specific education programs. Each laboratory also makes its resources available to precollege and university educators and students. Each laboratory plans and administers a range of precollege and university science education programs, which vary according to laboratory specializations and local needs, and which place special emphasis on providing students and their teachers with hands-on experience in cutting-edge science and technology.

TEACHER DEVELOPMENT PROGRAMS IMPACT AND ISSUES

Teachers are vital to the reform of science education. In the new paradigm of science education, the teacher is no longer the authority who imparts a fixed body of knowledge to students, but a facilitator and role model who skillfully guides students through the adventure of learning, encouraging them with questions and feedback and sharing their curiosity and excitement.

Of all the different types of education programs, teacher development programs have the greatest potential for reaching the largest number of students. For example:

High school teachers have 100–150 students per year; this equates to about 4,000 to 5,000 students over a 30 year career;

Middle school teachers reach 150 students per year or about 4,500 over a career; and

Elementary school teachers in a contained classroom have 20–25 students per year or about 1,000 in a career; elementary: specialized elementary math/science teachers serve 75–100 students per year or about 2,250 in a career.

Many researchers and educators agree that the most effective science teachers are those who are learners themselves, have a vision for how they want to change their classrooms, and spend time reflecting on their own teaching practices.

Teachers should also be able to understand the key concepts of science, model qualities they would like their students to possess, such as curiosity and enthu-

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siasm, and be able to assess the development of understanding. The Department's teacher development programs are built upon these central premises. The proposed Einstein legislation, if enacted, would be implemented along these same lines.

Another major action strategy followed by the Department and closely linked to our Teacher Development strategy is our focus on Evaluation and Assessment. We have pursued a rigorous program for quality of science content and instruction by doing the following:

Providing priority funding to systemic teacher and student programs since they hold the most promise for accomplishing learner achievement in science, mathematics and technology;

Providing evaluation training for all DOE education program managers

Collaborating with the National Center for Improving Science Education (NCISE) in the development of templates from research and best practice for program design, implementation and evaluation, and in the development of appropriate evaluation tools to measure impact.

Participating in an interagency National Science and Technology Council (NSTC) evaluation of teacher programs to determine the best practice across all agencies (the evaluation tools developed by the Department and NCISE will be used for the cross-agency evaluation); and

Developing a weighted and "automated" decision-making tool for the review of science education program plans and grants submitted to the Department.

A third major action strategy which impacts teachers is the Department's ability to utilize State-Of-The-Art Technology to improve and enhance classroom teaching. I would like to cite two examples in this context. The "Hands On Universe" program at the Lawrence Berkeley Laboratory illustrates the use of State-of-the-Art Technology to meet young people at their point of interest. Students from all over the country can access a multi-million dollar mainframe computer and do actual math, physics and astronomy computations. The linkage even includes the ability to ask scientists questions related to their respective disciplines.

On the morning of May 10 on NBC's "Nightside," the Hands-On Universe program was cited for the supernova discovery made by two female high school students, Melody Spence and Heather Tartara from Oil City Senior High, PA. These two students had requested images of a gorgeous cluster of stars about 13 million light years away from the LBL telescope because they were intrigued by what a "whirlpool" galaxy would look like and discovered a new supernova, M51, in the process.

Teachers and students are also provided direct access to the National Educational Supercomputer, located at the Lawrence Livermore National Laboratory. Teachers and students from across the country are provided access to this Supercomputer which includes mathematical and other models on numerous scientific problems including particle physics, seismology and global climate change. Janet Meizel, a high school teacher in Davis, California says that the teacher training program at the Livermore using the National Educational Supercomputer was the most valuable training she has received in the eight years she has been teaching. "The information I gained there has been immensely valuable to me in teaching my students, who range from extremely advanced computer science students to students whose academic skills are tenuous and who require motivation. I am working with a math teacher and a science teacher at present, using the programs developed by the LLNL staff, and have literally kept students in algebra, geometry and integrated physical science classes who would otherwise have dropped out. My own students consistently use the National Education Bulletin Board on the supercomputer. Many of these students are those who need practice in writing skills. They are also willing to practice graphing skills and to learn physics concepts, as well as develop telecommunication skills in order to produce three-dimensional, computer generated videos, whereas, they normally do not enjoy practicing these processes. It gives these students a sense of power and accomplishment which is not often matched in a school setting . . ."

A fourth action strategy which involves teachers is our focus on systemic reform. Reform in math/science education must be institutionalized and continued over the long-term. We must achieve a fundamental change of institutions and their systems; that is, the ways educators and policy makers define and deliver the curriculum, instruction, assessment, professional development, management, finance and governance of education.

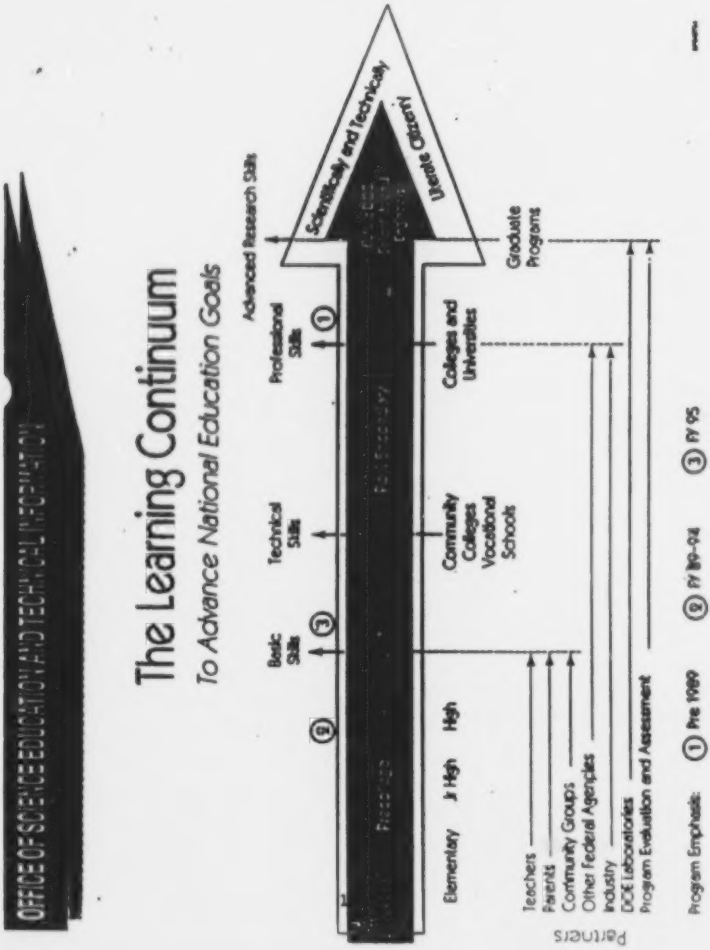
We are now in the process of changing many of our precollege programs including all of our teacher development programs to support systemic reform.

CONCLUSION

The Department oversees an unparalleled collection of scientific and technical facilities and equipment with extraordinary potential for kindling a sense of excitement about science and for increasing public science literacy. The Department has substantial capacity and experience in not only managing a wide variety of science education programs but doing so in partnership with other Federal agencies and private sector organizations. I have provided you with just a sample of these Departmental programs. The *Education Programs Catalog* as I noted at the outset of my testimony provides additional information on the programs sponsored by the Department.

This concludes my written testimony. I would be pleased to answer any questions Members might have on any or all of our education programs.

Exhibit I



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ACTION STRATEGIES
Volunteers/ Community Partnerships
Results Tracking
Usage of State-of-the-Art Technology
Training
Family Involvement
Enhanced Public Awareness
Interdisciplinary Approach
Teacher Development
Replicability
Underrepresented Populations (e.g., HBCUs)
After School Focus
Systemic Reform

Exhibit II

Senator FORD. Thank you very much.
Dr. Tegnelia.

STATEMENT OF DR. JAMES A. TEGNELIA, EXECUTIVE VICE PRESIDENT AND DEPUTY DIRECTOR, SANDIA NATIONAL LABORATORIES, ALBUQUERQUE, NM

Dr. TEGNELIA. Chairman Ford and distinguished members of the committee, I am Jim Tegnelia, Executive Vice President and Deputy Director of Sandia National Laboratories. Sandia is a multiprogram national laboratory with major responsibility in defense, energy, and the environment, as well as technology transfer and codevelopment with U.S. industry. It is managed and operated for the Department of Energy by Martin Marietta Corporation.

Thank you for the opportunity to share my views on S. 2104, the Albert Einstein Distinguished Educator Fellowship Act of 1994, sponsored by Senator Hatfield and co-sponsored by Senators Pete Domenici and Jeff Bingaman from my State of New Mexico, and their colleague Senator Cochran. I believe the bill will be helpful to us in the DOE national laboratories and will result in tangible improvements in our education outreach program. If successfully implemented at DOE, I would hope that the program could be extended to other agencies with science and mathematics education outreach activities.

At Sandia, our support of science education goes back nearly 30 years, well before any formal programs were initiated. Today this tradition continues with a broad array of outreach programs in math and science from elementary and kindergarten grades through university and post-doctoral levels. The DOE Assistant Secretary for Defense Programs is the major sponsor of this effort. DOE's Office of Science Education and Technical Information is also a substantial contributor.

We also actively support other DOE initiatives such as the Waste Management Education and Research Consortium, and WERC, that have extensive teacher and student involvements.

I should mention that the Bureau of Indian Affairs helps support Sandia's rural and American Indian outreach programs which have been very encouraging.

Our programs reach tens of thousands of students directly or indirectly and help hundreds of teachers to improve their science curricula and teaching tools. A summary of Sandia's science and math education outreach programs appears in my written testimony which I have submitted to you for the record.

Senator FORD. Without objection, it will be included in the record as if given.

Dr. TEGNELIA. Thank you, sir.

We recognize that the best way to leverage our impact and reach large numbers of students is by assisting teachers. Sandia offers or participates in several programs that are designed to help teachers. Sandia's goal of our highly acclaimed science advisors program, for example, is to help professional teachers become more comfortable and knowledgeable in math and science instruction. The program assigns a Sandia engineer, technician, or scientist to support the faculty at an elementary or middle school 1 day a week for the entire school year. The advisor works with the teachers at the

school to enhance their understanding of science concepts, develop a science curriculum, and design experiments and demonstrations for the classroom. Much encouraging feedback from teachers, parents, students, as well as some favorable trends in standardized test scores gives us confidence that this program is having a real impact.

The intriguing feature of the proposed Albert Einstein Fellowship is that the teachers and educators who will be fellows in the program are already "tops" in their field. Thus, in my view, the primary beneficiaries of the program will be the host DOD laboratories like Sandia, not the teachers themselves, although they will certainly profit from this experience.

The bill is not specific about what duties the distinguished educators will have during their fellowships at the national laboratories. I would like to suggest how they might be employed to enhance the effectiveness of a laboratory's education outreach activities.

At Sandia we have two full-time master teachers on contract to us from the Albuquerque public schools. These educators have proved to be invaluable as consultants to our education outreach activities. They help train the hundreds of technical staff who participate in the science advisors program. They help plan and develop workshops for professional teachers to enhance science understanding and course presentation skills. Since they are veterans of the classroom, these teachers are well accepted by other educators, and they have clearly improved our relationships and interactions with school personnel. I believe our master teacher program can serve as a useful model for the Albert Einstein Fellowships.

Teacher consultants can also be very helpful with the laboratory in collaboration with university departments of education. It has been reported that only 15 percent of elementary level teachers feel comfortable teaching physical sciences. Perhaps that discomfort arises from bad experience in science classes that were too technical or too intimidating. New science courses that present science concepts at a level appropriate for use in the elementary grades should be developed to inspire teachers. We are working with the College of Education at the University of New Mexico to introduce such courses into the elementary schoolteachers' curriculum of that State.

As you consider this legislation, you will surely evaluate the return on the taxpayers' investment in this program. We should expect Albert Einstein fellows to bring value to their school districts when they return to the classroom. We should have an influence on math and science teaching and expand the awareness of school systems of how Federal laboratories can contribute. They should share with their fellow teachers the educational resources, methods, and tools they have seen at our laboratories. They can provide a liaison with the laboratories for continued science education assistance. They might even establish science advisors' programs or similar educational partnerships with high technology businesses in their own communities. These and other metrics should be reported to the annual evaluation required by the legislation.

If done right with specific expectations and metrics, the Albert Einstein Distinguished Educator Fellowship Program has good potential for enhancing the contributions of DOE laboratories to science and mathematics education. We at Sandia support this legislation and are eager to host some of the outstanding mathematics and science educators who will qualify.

I do have specific comments with respect to the bill as currently written. Those are detailed in my written statement. However, I would like to call out one of those specific comments for your attention.

The high level of recognition required in section 4(3)(B) may disqualify worthy candidates from minority schools, particularly those in rural areas and from States that have few established awards programs like the Woodrow Wilson or Presidential Rank Awards. I would recommend that you allow for participation of some of these minority and rural school teachers in your bill.

Thank you very much for this opportunity to comment on the proposed legislation.

[The prepared statement of Dr. Tegnelia follows:]

PREPARED STATEMENT OF JAMES A. TEGNELIA, EXECUTIVE VICE PRESIDENT AND DEPUTY DIRECTOR, SANDIA NATIONAL LABORATORIES, ALBUQUERQUE, NM

Chairman Ford and distinguished members of the committee, I am Jim Tegnelia, executive vice president and deputy director of Sandia National Laboratories. Sandia is a multiprogram national laboratory with major responsibilities in defense, energy, and environment as well as technology transfer and co-development with U.S. industry. It is managed and operated for the United States Department of Energy (DOE) by Martin Marietta Corporation.

Thank you for the opportunity to share my views on Senate Bill 2104, the *Albert Einstein Distinguished Educator Fellowship Act of 1994*, introduced by Senator Hatfield and cosponsored by Senators Pete Domenici and Jeff Bingaman from my own state of New Mexico and their colleague Senator Cochran. I believe the bill will be helpful to us in the DOE national laboratories and will result in tangible improvements to our education outreach programs. If successfully implemented in DOE, I would hope the program could be extended to other agencies with science and mathematics education outreach activities.

At Sandia, our support of science education goes back at least thirty years, well before any formal programs were initiated. Our staff have long had a tradition of getting out into the local public schools to help out with science classes, science fairs, and the like. Of course, this sort of informal support for science and mathematics education in local schools is not unusual for high-technology businesses. But I suspect the national laboratories, with their long-range responsibilities for important national technical programs, have been especially aware of the importance of science education to our nation's future. Consequently, the Department of Energy's commitment in the last few years to science and mathematics education outreach in a formal way seems not only fitting but imperative.

Today this tradition of involvement continues at Sandia with a broad array of outreach programs in mathematics and science from elementary grades to university level. The DOE Assistant Secretary for Defense Programs is the majority sponsor of this effort. DOE's Office of Science Education and Technical Information is also a substantial contributor. In addition, we actively support other DOE programs, such as the Waste-Management Education and Research Consortium, which have extensive interactions with both students and teachers. I should mention that the Bureau of Indian Affairs helps support Sandia's rural and American Indian outreach programs, which has been very encouraging. Total outlays for education outreach at Sandia are eleven million dollars in fiscal year 1994. The program reaches tens of thousands of students, directly or indirectly, and helps hundreds of teachers improve their science curricula and teaching tools. (A summary of Sandia's science and math education outreach programs appears as an appendix to this statement.)

The centerpiece of Sandia's science and math education outreach effort is our Science Advisors program. We recognize that the best way to leverage our impact and reach large numbers of students is by strengthening teachers. Laboratory tech-

nical staff are not professional educators, and it is neither appropriate nor cost-effective for them to teach science directly. Consequently, the goal of the Science Advisors program is to help professional teachers become more comfortable and knowledgeable in science and mathematics instruction. The program assigns a Sandia engineer, technician, or scientist to support the faculty at an elementary or middle school one day a week for an entire school year. The advisor works with the teachers at the school to enhance their understanding of science concepts, develop a science curriculum, and design experiments and demonstrations for the classroom. Much encouraging feedback from teachers, parents, and students, as well as some favorable trends in standardized test scores, gives us confidence that the program is having a real impact.

We are confident that our Science Advisors program is an effective model for real impact in science education, and we are trying to extend its reach to a regional and possibly national scope. We have been working to make the program "portable," helping businesses in other cities establish their own science advisor programs with local schools. We maintain a resource center of science kits for practical classroom experiments and demonstrations and make them available to participating schools and businesses. We expect ten thousand requests for kits this year, so we know the program is being well received.

In addition to the Science Advisors program, Sandia offers or participates in several other programs that are designed to help teachers (see appendix). The intriguing feature of the proposed Albert Einstein Distinguished Educator Fellowship Program is that the educators who will be fellows in the program are already tops in their field. They have been recognized for outstanding achievement in teaching science or mathematics. Thus, in my view, the primary beneficiaries of the program will be the host DOE laboratories, not the teachers themselves (although they will certainly profit from the experience).

The bill is not specific about what duties the distinguished educators will have during their fellowships at national laboratories. Surely, some fellows will have individual needs and expectations for hands-on technical work in a laboratory environment, and we would hope to satisfy those expectations. However, I would like to suggest how the fellows might also be used to enhance the effectiveness of a laboratory's education outreach efforts.

At Sandia, we have two full-time master teachers on contract to us from the public schools. These educators have proved to be invaluable as consultants to our education outreach activities. They help train the hundreds of technical staff who participate in the Science Advisors program. They help plan and develop workshops for professional teachers to enhance science understanding and course presentation skills. Since they are veterans of the classroom, these master teachers are well accepted by other educators, and they have clearly improved our relationship and interactions with school personnel. I believe our master teacher program can serve as a useful model for how the Albert Einstein fellowships can improve the effectiveness of education outreach in DOE and other participating agencies.

Teacher/consultants can also be very helpful in collaborations with university departments of education. To have an impact on teachers entering the profession, it is important for the national laboratories to cultivate good working relationships with schools of education. It has been reported that only fifteen percent of elementary-level teachers feel comfortable teaching the physical sciences.[1] Perhaps that discomfort arises from bad experiences in science classes that were too technical or intimidating. New science course offerings should be developed for aspiring teachers that present science concepts at a level appropriate for use in the elementary grades. We are working with the College of Education at the University of New Mexico to introduce such courses into the elementary school teachers' curriculum in that state.

The Albert Einstein Distinguished Educator Fellowship Program will require an investment of federal monies. As you consider this legislation, you will surely evaluate the return on this investment to the taxpayer. We should expect Albert Einstein fellows to bring value to their school districts when they return to the classroom. They should have an influence on math and science teaching and expand the awareness in school systems of how the federal laboratories can contribute. They should share with their fellow teachers the educational resources, methods, and tools they have seen at the laboratories. They can provide liaison with the laboratories for continued science education assistance. They might even establish science advisor programs or similar educational partnerships with high-technology businesses in

[1] John Hollifield, "Examining Elementary Science Teaching," in *R&D Preview*, Council for Educational Development and Research, Nov. 1993.

their own communities. These and other metrics should be reported in the annual evaluation required by the legislation.

If done right, with defined expectations and metrics, the Albert Einstein Distinguished Educator Fellowship Program has potential for enhancing the contribution of the DOE laboratories to science and mathematics education. We at Sandia support this legislation and are eager to host some of the outstanding mathematics and science teachers who will qualify as fellows.

I do have a few minor concerns with respect to the bill as currently written:

The requirement that candidates have "established an effective energy conservation program" [Sec. 4(3) (A)] is too restrictive. If the goal is to establish correspondence with DOE missions, the language can be broadened to include the environmental and science and technology missions as well.

The high level of recognition required in section 4(3)(B) may disqualify worthy candidates from some minority schools, particularly those in rural areas or from states that have few established awards for recognizing outstanding teachers.

The provision to send all twenty semifinalists to Washington, DC for interviews may perhaps build expectations too high and create unnecessary disappointment for the ten individuals who are not selected.

The ten-month term of the fellowship may create a hiatus in employment for some teachers who may be on academic-year contracts. It would be helpful to permit flexibility in the term up to twelve months.

The final selection process is undefined by the legislation. However, it is important that the needs of individuals and the host laboratories both be considered when placements are made.

The bill contains no provision to compensate the host laboratories for administrative and occupancy costs incurred during the fellowship. While these costs are comparatively small, you should be aware that they will be imposed on the technical programs of DOE and other agency sponsors.

Thank you again for this opportunity to comment on the proposed legislation.

[Appendix]

SCIENCE AND MATHEMATICS EDUCATION OUTREACH PROGRAMS AT SANDIA NATIONAL LABORATORIES

Sandia's outreach programs in science and mathematics education form an extensive and interrelated set of offerings for students, teachers, and faculty. Each program is designed to improve scientific and technical literacy and to increase the number of scientists and engineers from historically underrepresented groups in support of DOE's goal of a technically literate and culturally diverse work force. The programs are designed to offer a seamless transition for students interested in careers in science or engineering, beginning in grade school and continuing through twelfth grade and college.

SCIENCE AND MATH EDUCATION ENHANCEMENT FOR STUDENTS IN GRADES 1 THROUGH 12

The Science/Math Carnival makes learning fun for elementary school students and encourages educators to teach science and mathematics. The carnival offers fourteen hands-on activities at eighty schools in northern California every year.

The Summer Science Enrichment Program was developed for elementary school students belonging to groups underrepresented in science, and offers a means for children and their parents to explore science at home.

The After-School Science Club for middle school students engages in a wide variety of experiments and activities, including selected environmental science modules.

The New Mexico State Science Olympiad allows middle and high school students to engage in hand-on activities in almost every aspect of science. The olympiad encourages competitors to excel in science thinking and applied science individually or on a team.

The Expanding Your Horizons Program, sponsored by the Math/Science Network, encourages junior high and high school girls to explore many scientific disciplines and numerous science and technology career options. Sandia is an annual co-sponsor of Expanding Your Horizons career fairs in California and New Mexico.

The College Bound Program at the Southwestern Indian Polytechnic Institute provides ninth- through twelfth-grade students the skills and motivation to remain in school and to enter college in a math-, science-, or technology-based field.

The DOE High School Science Student Honors Program cultivates relationships with outstanding students and enhances Sandia and other DOE national laboratories' future technical work force.

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The High School Speaker's Bureau provides lectures from Sandians about specialized math and science topics and offers career information.

The New Mexico Supercomputing Challenge encourages high school students to design and run computer programs and then offers scholarships to promising students to attend New Mexico universities.

The DOE National Science Bowl hosts regional competitions for this science, mathematics, and technology question-and-answer tournament.

The School Partnerstup Project recruits, trains, and equips scientists and engineers to conduct motivational hands-on science activities with students to make science more understandable, make science principles interesting and relevant, and foster positive impressions of science and scientists.

Three supplementary student projects are offered after school: Hands-On/Minds-On Technology for African-American students; the Dream Catcher Science Program for American Indian students; and the Hands-On Science and Engineering Program for Hispanic students.

TRAINING AND CURRICULUM DEVELOPMENT FOR TEACHERS OF GRADES 1 THROUGH 12

The Adventures in Supercomputing Project bolsters computer literacy and scientific understanding among teachers by providing access to high-performance computers, software, networks, and expertise.

The Bay Area Science ad Technology Education Collaboration, of which Sandia is a member, improves mathematics, science, and technology education in California schools by helping teachers gain a better understanding of basic science concepts taught in the science/math carnival.

The Bureau of Indian Affairs ad Rural Schools Science Advisors Program enhances teachers' skills in science and mathematics instruction.

The DOE Teacher Research Associates Program provides summer opportunities in scientific and engineering research for outstanding high school science and mathematics teachers.

The Gaining Access to Natural Abilities in Science Summer Teacher Enhancement Program brings together science and math teachers, engineers, and trained personnel to expand middle- and high-school teachers' knowledge of current science topics.

The Math through Applications Program improves sixth- through ninth-grade students' mathematics competency and shows them how math relates to everyday life, using experimental demonstrations, computer simulations, and computer programming. The DOE/National Science Foundation-funded program is a collaboration among Sandia, the Institute for Research on Learning in Palo Alto, California, and the School of Education at Stanford University.

The Portable Science Advisors Program provides program design guidance, assistance in establishing resource centers, technical assistance, and workshops for science advisors and teachers.

The Science Advisors Project assigns an engineer, technician, or scientist to support the faculty at an elementary or middle school one day a week for an entire school year.

The Science Education for Public Understanding Program provides teachers with a model for hands-on instruction and with all materials needed for performing experiments in a class of thirty-two students. Two engineers devote twenty percent of their time as science advisors and program developers for middle schools by offering workshops, providing science modules for classroom use, providing access to equipment and material, and helping teachers upgrade their science curriculum.

Science Seminars are open to first- through twelfth-grade teachers and describe the science behind the headlines (e.g., "Lasers Are So Simple We Can Use Them Anywhere").

The Summer Teacher-Enrichment Project for middle- and high-school teachers upgrades their knowledge and skills through practical experience in programs and projects at Sandia.

The Teacher Opportunities to Promote Science Program for middle school teachers in rural areas provides a three-year training program in science. Teachers improve their teaching skills and serve as role models and mentors to their colleagues.

The Science Understanding Promotes Environmental Responsibility Summer Institute for middle- and high-school teachers presents the science behind such environmental issues as risk assessment and management, groundwater cleanup, plastics, and hazardous waste cleanup.

The Leadership Academy for Science Education Reform is a multi-year workshop that provides role models of good science instruction and is based on a teaching/

learning model that parallels the way scientists acquire knowledge and solve problems.

PROGRAMS FOR COLLEGE AND UNIVERSITY UNDERGRADUATE STUDENTS

The American Indian Community College Initiative develops accredited, two-year technology programs at the Southwestern Indian Polytechnic Institute in Albuquerque, New Mexico.

The Cooperative Education Program enables undergraduate students to acquire laboratory experience along with college studies.

The Historically Black Colleges and Universities Program offers summer employment for academic credit to exceptional junior, senior, and graduate engineering and science students.

The Las Positas College Scientific Honors Program offers academically outstanding, financially disadvantaged, first-generation college or minority students summer work experience at Sandia/California.

The Minority Engineering Program provides advisors, tutors, and mentors for Hispanic and American Indian engineering students at the University of New Mexico.

The Outstanding Student Summer Program offers engineering and science majors from the junior year through graduate studies an opportunity for summer work in a laboratory.

The Science and Technology Alliance is intended to increase the number of African Americans, American Indians, and Hispanics in scientific and engineering programs of DOE, other government agencies, and private industry. Participants include the following: Los Alamos National Laboratory in New Mexico; Oak Ridge National Laboratory in Tennessee; the Fundación Educativa Ana G. Mendez in Puerto Rico; New Mexico Highlands University; North Carolina A&T State University; Salish Kootenai College, Fort Peck Community College, and Little Bighorn College, and Rocky Mountain College in Montana; Georgia Institute of Technology; AT&T; and Martin Marietta.

The Summer Employment for Minority Youth Program for university freshmen and sophomores (and high school juniors and seniors) provides real-world work experience for students with mathematics and science interests.

The Summer Employment Program for Native Americans recruits undergraduate and graduate students nationwide who are enrolled in a math, science, engineering, technology, or computer science program.

The First Lunar Shelter Student Contest required the tele-robotic construction of a model lunar base. This competition exposed students to real-world problems associated with project planning, budget constraints, system integration, and teamwork.

PROGRAMS FOR UNIVERSITY GRADUATE STUDENTS

The Graduate Engineering Internship Program provides opportunities for University of New Mexico graduate students in engineering and science to acquire meaningful laboratory experience by alternating work and academic experience.

The National Consortium for Graduate Degrees for Minorities in Engineering provides opportunities for students from underrepresented groups to obtain master's degrees in engineering through a program of paid summer internships and financial aid.

The One-Year-on-Campus Program recruits underrepresented engineers and scientists having a bachelor's degree and a high grade-point average and allows them to attend graduate school full-time for a year.

The Postdoctoral Internship Program hosts postdoctoral students in areas of research where Sandia expertise or facilities provide a good match for students' interests.

The Postdoctoral Program offers outstanding job candidates with PhD degrees in technical fields exposure to the Sandia work environment.

PROGRAMS FOR UNIVERSITY FACULTY

The Western Partnership for Environmental Technology Education develops and enhances environmental technical programs at community colleges by sharing technical resources from federal laboratories, state agencies, and private industry with the academic community.

The University Research Program provides research funding for two years to faculty members at the three PhD-granting institutions in New Mexico. The program is limited to new faculty and the "seed money" is sufficient only to fund one graduate student, pay the summer salary of the faculty member, and reduce the teaching load during the academic year.

The Distinguished Professor Program furnishes Sandia technical staff to teach courses at the University of New Mexico and assist in the development of collaborative research projects. The position is fully funded by the University of New Mexico, and Sandia staff members are provided with office space and the title and responsibilities of a visiting professor.

The Joint Appointments Program seeks new faculty members for positions in fields important to both the University of New Mexico and Sandia. Appointees devote half-time to teaching at the university and half-time to research at Sandia for two years.

The University Faculty Summer Employment Program and Academic Year Sabbatical Program attract outstanding professors from universities nationwide. These professors are considered temporary employees who work on research and development projects specified by Sandia organizations.

Senator FORD. Thank you very much.

Dr. Fowler.

STATEMENT OF DR. JOHN M. FOWLER, EXECUTIVE DIRECTOR, TRIANGLE COALITION FOR SCIENCE AND TECHNOLOGY EDUCATION, COLLEGE PARK, MD

Dr. FOWLER. Chairman Ford, distinguished members of the subcommittee, I am pleased to appear this morning in support of the Einstein Fellowship bill. For the past 4 years, the Triangle Coalition for Science and Technology Education, of which I am the founder and executive director, has provided funding, administrative support, coordination, and strong encouragement for this program. In 1989 some of the coalition staff coordinated the Presidential Awards for Excellence in Science and Math program for the National Science Foundation. We saw the value of using this growing pool of talented and committed educators as a resource for the national movement to reform education. You may recall that the national education goals were being fashioned by the Nation's governors at that time. The coalition believes teachers' firsthand experience in the classroom can be of enormous benefit to policymakers and Federal education program administrators.

We approached the MacArthur Foundation to fund the first year of a new fellowship program. That same year we asked Senator Mark Hatfield to introduce and support a concurrent resolution that would authorize a fellowship program on Capitol Hill; that would provide an opportunity for outstanding teachers to come to Washington for an academic year; that would allow them to join either the staff of a committee or of a member of Congress; and provide the Senate and House with the benefit of teachers' unique insight into education while working on a variety of issues as part of the legislative process.

I want to take this opportunity to personally thank Senator Hatfield and his legislative director, Sue Hildick, for their unfailing support, and I just missed him I see.

Senator FORD. Well, you are not going to miss him. He has gone over to vote so that he can come back and we will not have to keep you all waiting here. We are trying to be helpful this morning.

Dr. FOWLER. We will make sure he hears that I thanked him.

Senator Hatfield's leadership has brought us to a point at which we can now contemplate the permanent authorization of the Einstein Fellowship Program.

Mr. Chairman, there are several aspects of the history of this program which you may find of interest. Since academic year 1990–

91, there have been 12 Einstein fellows, with an equal number of mathematics and science teachers represented, and the program has had 7 sponsors in the Senate and the House.

Senator Hatfield's staff first suggested the program be called the Einstein Fellowship Program because they believe it conveyed an instant image of excellence, identified with the pursuit of science and application of mathematics. The use of the Einstein name was approved by the Einstein Foundation in Chicago when the program was first introduced in Congress.

Mr. Chairman, the teachers who have served as Einstein fellows have both personally benefitted and contributed to the legislative process. For example, in 1990–91, Art Lebofsky who worked for Senator Jeff Bingaman helped shape the legislation that led to the creation of the National Commission on Time and Learning. Art now is a member of the National Science Teachers Association Board of Directors while continuing his profession as a teacher and an instructional leader in New York.

Erma Anderson working as an aide to Senator Arlen Spector returned to the classroom, became active in helping the Pennsylvania Department of Education develop a defined statement of student learning outcomes, and recently was loaned to the National Research Council to work on their science standards project.

In the 1993–94 academic year, Bonnie Leitch worked on the staff of the Senate Labor and Human Resources Committee. She provided valuable help to members working on the reauthorization of the Elementary and Secondary Education Act, particularly title III dealing with the use of technology in education. Her experience in the classroom and work on the Hill reflect the double benefit of her fellowship.

Every teacher who has been part of this program left Washington with a sense of gratitude for the experience and appreciation for the real legislative process and a new sense of enthusiasm for the importance of what they can do as teachers. We have provided supplementary materials that give some anecdotes, and that I would like to see entered in the record.

Senator FORD. Without objection, it will be included in the record.*

Dr. FOWLER. Their enthusiasm encourages my own. I hope it encourages you to support the authorization of the Einstein Fellowship Program.

We believe the Department of Energy is an ideal agency to place responsibility for this program. As a scientifically oriented mission agency, it offers a context of concern for both science and education, coupled with the broad range of existing programs which are, as we have heard, quite compatible with the Einstein program. The Triangle Coalition believes the Department of Energy is the best place to assign the program because even as a small program in this mission agency, it will not be totally lost in comparison with dozens of professional development programs run by other Departments. As a fellowship program for teachers within the Department of Energy, it will be unique.

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*See appendix.

We strongly believe, however, its final structure should more closely approximate the structure it now has rather than that proposed in S. 2104. It would be unfortunate to confine the service of future Einstein fellows to only one agency. Fellows should continue to serve on Capitol Hill, two in each house, and at least six other agencies where issues of education in science, mathematics, and technology are of interest and where the experience of a teacher fresh from the classroom and anxious to contribute can be of great benefit.

Mr. Chairman, 2 months ago the Congress put into law the Nation's educational goals. One of these uniquely addressed the desire we all share to see American students achieve at the highest levels in science and mathematics.

The Einstein Fellowship Program is a small but highly important step toward creating mechanisms to help attain that goal. Its passage will enable policymakers like yourself, your staff, and agency officials to have the benefit of the experience, understanding, and firsthand knowledge of teachers while providing them with an opportunity to learn how educational policies, programs, and legislation are developed, nurtured, and implemented. The Einstein program promises immense benefits to both individual teachers in the teaching profession, as well as the organizations where the teachers serve.

Thank you, Mr. Chairman. I would be pleased to answer any questions you might have about our work with the Einstein program.

Senator FORD. Thank you, Dr. Fowler.

We have been joined by one of the major co-sponsors, Senator Domenici from New Mexico. Senator Domenici, would you like to make a statement?

STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

Senator DOMENICI. Yes, I would, Mr. Chairman, and I thank you very much.

Might I say to the witnesses I apologize for not being here sooner. As the good chairman will tell you, there is no science to the way we hold our hearings. Nobody bothers to punch in a computer and see whether Chairman Ford has two different meetings at the same time. He calls one and somebody else may call one he is supposed to go to. That is what happened to me. I had Appropriations.

Senator FORD. And so it is always exciting.

[Laughter.]

Senator DOMENICI. You have to pick and choose, but I am pleased that I had plenty of time to come here and be with you.

Mr. Chairman, I wanted to share with you the excitement that is going on at Sandia National Laboratories. As you know, we got a new contractor, and Dr. Tegnelia is here who is from Martin Marietta and is now second in charge at Sandia. I think that transition is going marvelously well, and I assume that Jim would agree with that.

I also want to thank you for your opening remarks, albeit brief. I think it succinctly stated how important the Department of

Energy is to math and science in this country and to the employment of expert and well-trained scientists and also to achievement in math and science. That is why we are here today because clearly we want to use the Department of Energy for further purpose with reference to the Einstein type scholarships or fellowships.

There are a number of great programs going on within the laboratories, and I might say to you, ma'am, Ms. Rumsey, I think you have a very big responsibility because $140 million, if our chairman is right, that you will put into education in math, science, and the like is so little known among our fellow Senators and U.S. Representatives. They truly believe these national laboratories are just building nuclear weapons. They have no understanding of the multiple discipline that goes on there and the application of this broad base of technology and science to many, many fields. I would hope that you are enthusiastic about seeing to it that you continue to fund these programs and to keep them at very high levels.

About 3 years ago, as you know, a number of these started under the Admiral in charge then. A number of Senators had a lot to do with talking him into diversifying the mission and seeing to it that money was spent on education endeavors, and you have inherited a great legacy and I hope you make it better.

I just want to talk about one in addition to the ones that have been spoken about here and then perhaps ask a couple questions when my turn comes.

Mr. Chairman, you and I were engaged for a long time in uranium enrichment, corporate development, and where were we going as a Nation. Well, right alongside of that, you will recall we were involved in a waste isolation pilot project, nicknamed WIPP around here and around the country. About two-thirds of the way through, it became obvious that that waste isolation pilot project, if it succeeded, would become a very, very major American waste management effort with great educational potential with reference to the management of waste.

Admiral Watkins agreed at that point to set up a consortium between the universities, the WIPP project, and both of the major laboratories in New Mexico. It is now called the WERC program. That stands for Waste Management Education Research Consortium.

Mr. Chairman, I can tell you that because of its relationship to the laboratories, it is the leading American source of granting degrees in the science of waste management. It used to be that you got all that under the old-time rubric of getting a civil engineering degree or you got a straight science degree. They have developed a curriculum which is attracting universities all over the country. They are producing the curriculum and giving it to universities, where young people are excited about going to an engineering school but end up with a degree that focuses on environmental cleanup and environmental control. That is a very exciting kind of activity, and I hope you agree with that and I will ask you a question about it when my time comes.

But that program now seems to be well cemented and moving along within educational institutions as a pilot and we would hope that the Department and this committee would continue to support that program not only because it is in our State and it takes our

three great science universities and puts them with the DOE, but I think it is beginning to have a ripple effect on how we grant degrees and what kind of curriculum should be used to excite our young people who want to be in environmental cleanup and environmental control and waste management along with engineering, a very, very much needed kind of educational endeavor.

Thank you very much, Mr. Chairman. I spoke longer than I should have, but you probably guessed that when you called on me.

Senator FORD. Well, I always find when most people do not follow their script, they get carried away.

[Laughter.]

Senator FORD. I have a few questions.

I want to be sure we do the right thing. Dr. Fowler made a statement where the scholarship recipient worked for Labor and Education and kept that committee on track as it related to the programs in elementary and secondary education. It is a good program I think. It brings teachers here to us to keep Congress from messing up. We need all the help we can get.

Let me ask Ms. Rumsey. You have a list of all the teachers, the number of teachers, number of students, and your follow-up on your program in the background or additional information you submitted for the record. You have several scholarship programs at DOE. Tell me how DOE sponsors differ from one another. You have different programs. How do they differ?

Ms. RUMSEY. Exactly. The Teacher Research Associates program, TRAC, is an 8-week summer research experience at the Department of Energy laboratories. The Summer Teacher Enhancement Program, STEP, is a 4-week teacher development workshop that concentrates on content and teaching skills. Finally, there are a series of regional teacher workshops that are conducted at the individual laboratories and facilities.

Senator FORD. DOE's teacher fellowship programs are for a summer and this bill calls for a year-long fellowship. Should the fellowships be for a year or for a summer?

Ms. RUMSEY. We believe that fellowships should be for a year. Advance TRAC teachers and researchers request that teachers participate for longer periods because the research and the reports take longer than a summer. As well as getting to know the laboratory work, getting to know the culture, being comfortable with the technology and the scientific process also takes longer than 6 weeks.

These teachers will become master teachers for their colleagues. Therefore they need time to synthesize and internalize their science research and have time for reflection in order to develop strategies to pass along to their colleagues.

Senator FORD. You all jump in anytime. I am basically going to be zeroing in on the Department of Energy because that is where we are planning on working out all this.

I agree with the year around. We have had interns in our office, and one turned into 2 years instead of 1 year, but nevertheless, that is the way it goes. This one came from EPRI which was very important as it relates to this committee and my background.

How much does it cost to pay for a year-long fellowship? Do you have any idea of the round figures? We will not hold you to an absolute, guaranteed amount.

Ms. RUMSEY. We would say roughly about $52,000 a year for a year-long fellowship program.

Senator FORD. So, the 10 fellowships that are called for in this would be roughly $500,000 or $520,000 if we figured that right.

Ms. RUMSEY. Correct.

Senator FORD. Is 10 fellowships about right? Should it be less, or should we expand it? How would you feel about that?

Ms. RUMSEY. We think that 10 for the first year is a good test pilot. It will give us an opportunity to fine-tune it based on their experiences, and once those experiences are understood, that will enable us to move forward for considering expansion if the funds are available.

Senator FORD. Do you all agree with what she is saying here?

Dr. TEGNELIA. Sir, I would like to second the comments with regard to the duration of the appointment. Our experience with our master teachers is that it takes them several months before they really understand what the laboratory is, understand what their responsibilities could be within the school districts, and if you really want to have a benefit from them participating, it is going to take them the better part of a year.

I would suggest to you, as a matter of fact, that the legislation be written not for an academic school year, but for a calendar year in order for them to go through one complete cycle of the school system.

Dr. FOWLER. Our experience has been that since these teachers are going on leave and going back, that 10 months is a good slot for them. They need to get some break time before and after the fellowship when they go back to school.

On the financial side, I would agree with the $52,000 per fellowship. About $45,000 of that is salary, but then there is travel money and some administrative costs for searching for them and interviewing them and so forth.

I think that I would want to reemphasize my recommendation that we put these fellows in other agencies as well as the Department of Energy. The Department of Energy is rich in teacher contacts and some of the other agencies are not. The number that we would recommend is ten, two in the House, two in the Senate, and then six in six other selected agencies.

Senator FORD. This will be my final question. Senator Domenici and I are getting ready to vote. Senator Hatfield should be back and Senator Domenici has a question or two.

One thing that Mr. Tegnelia said that reached me a little bit was the minority role. I visit with teachers in the mountains in Appalachia where they have one computer for 27 students. My grandchildren's classes have one for every two students. Children in the mountains are keen and sharp. They just do not have the ability to get a hold of it. I agree with that.

So, there is a limit. The fellowship program is limited to teachers who are outstanding, as I read it here, and who have made a contribution to energy conservation. Well, who should decide? That gets down to your question I think, Jim.

The bill says a teacher is outstanding if certain requirements are met. Are those requirements too tough? Will we not exclude good teachers by spelling out what outstanding means? We might draft that so it would fit us. We have to be very careful.

So, I want some input from the three of you, if I could, and we will just start and go down the line here. Ms. Rumsey, do you have any thoughts on that?

Ms. RUMSEY. Yes. We would be looking for teachers who have the capability and the commitment to become outstanding teachers when they return to their schools, particularly in the role of the master teacher, that is, to teach other teachers, as well as we would expect them to contribute to the long-term systemic reform effort.

Dr. TEGNELIA. Sir, we have a program in Sandia which is called RAISE, R-A-I-S-E. It is Rural American Indian Science and Education activity. We spend quite a time with some of the rural and Native American schools and with some of the students and with their teachers. I would assure you that there are some very dedicated teachers in those school systems that are making a tremendous impact on young students that they have underneath their wing. I think that we ought to have a local selection process which makes them at least eligible for nomination into this program so that they can, in fact, participate with the laboratories and be able to carry back to their school systems some of the wonderful opportunities that exist in the laboratories and in some of the other agencies.

Senator FORD. Dr. Fowler?

Dr. FOWLER. Yes. When we began this program, I, in fact, wore two hats and directed the Presidential Awards for Excellence in Science and Mathematics teaching. I was impressed with the quality of the teachers that I saw there. Our major goal was to bring outstanding teachers to Washington. We did not see that fellowship program as a program that nurtured master teachers or helped them become better teachers, although that was a side effect of that.

Senator FORD. I do not want to cut in, but we do have to go and Senator Domenici wants to ask a couple of questions.

I just think DOE should not hire an outside contractor. They ought to go ahead and do it themselves. We will at least be frugal on that point.

Senator Domenici.

Senator DOMENICI. Thank you, Mr. Chairman.

I wonder, Ms. Rumsey, if you would at your earliest convenience submit for the record a summary of all of the things that are being done in the Department for minority education, in particular in math and science and in particular at the high school and college level, but I would appreciate a summary of all of them.

I think it is very important at least for some of our States that house facilities like a national laboratory with a large minority population. We constantly are confronted with a lack of high management positions among the minorities and the answers always are there are not enough Ph.D.'s. There are not enough experienced physicists. Our people get tired of those answers and I think we have to do a little more to show them that we are very

concerned about that, if it is so. So, I would like to know what we are doing just so that maybe we could share together on what we might do better.

Ms. RUMSEY. I would be happy to.

[Subsequent to the hearing the following was submitted:]

The Department of Energy conducts minority education programs that focus on the range of audiences from pre-college through post-graduate. Further, many of the programs are designed to have sustained impacts through systemic reform and the effective use of formal collaborations. The following is a summary of the Department's representative programs. The "Education Programs Catalog", which you have already received should, be referenced for a more thorough account of the Department's effort.

OFFICE: SCIENCE EDUCATION AND TECHNICAL INFORMATION

Apprenticeship program

Audience: High school students

This program is designed to motivate freshmen and sophomore high school minority and female students to pursue science careers. Students go to one of the National Laboratories for six to eight weeks during the summer to perform laboratory research, attend lectures and seminars and participate in field activities.

Prefreshman Enrichment Program (PREP)

Audience: Junior/high school students

Participating institutions, primarily colleges and universities with science-based degree programs, conduct summer institutes for students in grades 6-10. The goal is to capture and retain students' interest in science by guiding them to college-preparatory science and mathematics courses. The summer activities focus on encouraging students, particularly women and minorities, to consider science-related careers. The Prefreshman Enrichment Program provides a number of experiences including laboratory work, field trips, tutoring, and counseling. Institutions are encouraged to share the cost, using university, industrial, or other non-federal support.

Council of Energy Resource Tribes (CERT) student internships and fellowships

Audience: Undergraduate and graduate students

The Department of Energy, together with its National Renewable Energy Laboratory and the Western Area Power Administration, provides research opportunities for Native American college students. The Council of Energy Resource Tribes, in turn, provides Federal researchers with training on tribal affairs including energy on the reservations and a basic understanding of Native American culture.

Rural/urban partnerships

The Department supports partnerships between DOE laboratories and more than a dozen urban and rural school systems, affecting thousands of teachers and their students. In most cases, state and local governments and private sector and community groups are involved. Examples of these partnerships include:

Bay Area Science and Technology Education Collaboration (BASTEC)

Audience: Pre-college teachers and students

BASTEC is a collaborative effort to strengthen the Science, Math and Technology Education in the Oakland Unified School District (OUSD). OUSD was selected because of its large minority population and its proximity to four DOE National Laboratories (Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory, Sandia National Laboratory and the Stanford Linear Accelerator Center). To date 21 organizations, including the laboratories, are participating in this collaboration. In October 1990, a Memorandum of Understanding was signed between the OUSD and the DOE to develop, implement, and coordinate programs for improving science, math and technology education in OUSD. BASTEC's mission is to enable OUSD teachers to improve the teaching and learning of science, math and technology for all K-12 students.

Options

Audience: Middle school teachers and students

Pacific Northwest Laboratory's programs link the human and technical resources of the lab with students and teachers in Oregon and Washington State minority dominated middle schools. The goals of the program are to help middle school students see that science offers options for an exciting, stimulating, fulfilling life's work and to provide teachers with options for teaching science, mathematics and technology.

Trenton partnership

Audience: High school teachers and students

The Princeton Plasma Physics Laboratory formed an educational alliance with the Trenton, New Jersey school system, which is 80% minority and has a 50% high school dropout rate. The lab staff provides teacher enhancement programs, equipment and material loans or grants, in-classroom lectures and demonstrations, science fair assistance and judging, and special tours.

Science Advisors Program (SCIAD)

Audience: High schools

Sandia National Laboratories is working to improve the mathematics and science education of Native American Schools in New Mexico and Arizona and in the predominately Hispanic schools of the Albuquerque Public School System. Through Sandia's SCIAD Program, Scientists serve as resources to teachers and as role models to students. Science Advisors spend up to one day a week for the entire school year working to enhance science and mathematics education.

Science and Mathematics Action for Revitalized Teaching (SMART)

Audience: K-12 students and teachers

In an effort to increase the effectiveness of K-12 science and math education in Tennessee, this partnership involves collaboration of two DOE facilities (Oak Ridge National Laboratory and Oak Ridge Institute for Science and Education), a community college, local businesses, and state and local governments in collaboration with the Chattanooga Public Schools and Roane County Schools. Teachers take part in laboratory based summer programs and hands-on workshops which enable them to develop and utilize new teaching strategies. Students have the opportunity to attend a summer science camp.

Minority Access to Energy-Related Research Careers (MAERC)

Audience: Undergraduate students

MAERC is a collaborative effort of the Associated Western Universities (AWU), the California State University (CSU) system and four DOE laboratories (Idaho National Engineering Laboratory, Los Alamos National Laboratory, Lawrence Berkeley Laboratory, and National Renewable Energy Laboratory). The purpose of the MAERC program is to identify, encourage, and support outstanding underrepresented minority CSU students enrolled in science or engineering. Through strengthening undergraduate research training on the home campus and fostering participation in energy-related research activities at participating DOE laboratories, the program seeks to increase the number of well-prepared minority students pursuing advanced degrees in these fields and interest these students in energy-related research careers. Summer research internships at DOE laboratories are provided for MAERC students.

Minority Undergraduate Training for Energy-Related Careers (MUTEC)

Audience: Undergraduate students and teachers

The objective of the Minority Undergraduate Training for Energy-Related Careers program is to attract and retain more minority students in scientific and technical four year degree programs critical to energy-related research and technology. The students involved are provided financial assistance, summer job opportunities, and mentoring and counselling on future career options that include graduate school. Faculty members at the participating institutions are also involved in energy-related research to ensure their technical currency and to recruit additional students for their programs.

Laboratory/minority institution alliances

Audience: Undergraduate and graduate students

Department of Energy National Laboratories have formed a number of alliances with Historically Black Colleges and Universities and Minority Institutions to: 1) provide comprehensive and long-term technical assistance designed to upgrade the institutions' research and teaching capabilities and 2) attract minority students to, and retain them in, scientific and technical professions. Activities include student research opportunities, visiting scientist programs, academic support systems for minority students, seminars, new-course development assistance, equipment loans and other support. Examples of these alliances include:

Science Consortium—Lawrence Berkeley National Laboratory, Jackson State University and the Ana G. Mendez Educational Foundation of Puerto Rico;

Science and Technology Alliance—Sandia, Los Alamos, and Oak Ridge National Laboratories, North Carolina A&T State and New Mexico Highlands Universities, and the Ana G. Mendez Foundation;

Science and Engineering Alliance—Lawrence Livermore National Laboratory and Alabama A&M, Prairie View A&M, Jackson State, and Southern Universities.

OFFICE: ENVIRONMENTAL MANAGEMENT

The Historically Black Colleges and Universities/Minority Institutions (HBCU/MI) Technology and Waste Managements Consortium

Audience: Graduate students

Formed in 1990, this consortium is the historic union of seventeen minority-serving graduate institutions. The program includes curriculum development and enhancement, student scholarship and internship opportunities, faculty development, research opportunities, and outreach activities aimed at increasing environmental literacy. The seventeen members include Alabama A&M University, Clark Atlanta University, Florida A&M University, Florida International University, Hampton University, Howard University, Jackson State University, New Mexico Highlands University, North Carolina A&T University, Northern Arizona University, Prairie View A&M University, Southern University at Baton Rouge, Texas A&I University, Texas Southern University, Tuskegee University, University of Texas at El Paso, and Xavier University of Louisiana.

Partnership for Environmental Technology Education (PETE)

Audience: Undergraduate institutions and students

PETE was developed to enhance science and mathematics education and to create specific training and educational opportunities for disadvantaged minorities. This regional partnership includes the community college systems of Arizona, California, Hawaii, Nevada, Utah, and the Navajo Nation. The objectives are to link the community colleges to the technical resources of the Department of Energy, the Environmental Protection Agency, the National Aeronautics and Space Administration Laboratories, and private industry. Partnership 'activities include providing scholarships and assistance to develop and deliver environmental management programs, summer internships at the Federal labs, cost and equipment sharing arrangements, and semi-annual resource instructor conferences.

American Indian Higher Education Consortium (AIHEC)—Project PERMA (Promoting Environmental Restoration Management for American Indians)

Audience: Undergraduate institutions

Through DQ University, Project PERMA is designed to work with the 27 American Indian Higher Education Consortium member colleges interested in strengthening science and math programs and adopting certificate and/or degree programs in environmental restoration and waste management. The consortium will be expanded to link these colleges with area senior academic institutions and Federal Energy Labs. The purpose of this consortium is to develop the capability to secure Federal and other support to strengthen math/science and environmental restoration and waste management programs.

Environmental management technician program

Audience: Undergraduate students

Community colleges provide post-secondary training opportunities for women and minorities; retain and upgrade the skills of current employees; act as bridges between high schools, and four year institutions; and 'attract and train the next generation of technicians at DOE sites where their skills are needed. Programs

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related to environmental restoration and waste management technician training are underway at the following community colleges located near Department of Energy facilities:

- Cincinnati Technical College, Cincinnati, Ohio: Environmental Engineering Associate Degree;
- Columbia Basin College, Pasco, Washington: Waste Management Technician Training Program;
- Mesa State College, Grand Junction, Colorado: Associate Degree program in Environmental Restoration Technology;
- Navajo Community College, Shiprock, New Mexico: Two-year curriculum in Earth and Environmental Sciences and Solid Waste Management Education;
- Wilber Wright College, Chicago, Illinois: Waste Management Technical Degree Program.

The objectives of these community college programs are: 1) to help develop community college curricula related to environmental restoration and waste management, and 2) to develop employment and/or financial assistance programs that will assist community college students in obtaining Environmental Restoration and Waste Management Degrees.

Summer and Transfer Achievement Readiness Program (STAR)

Audience: High school students

This program targets underrepresented minority students with career interests in math, science, engineering, and environmental restoration and waste management. It offers university-level science and math courses, summer work experiences at a DOE facilities, and programs that encourage students to explore high school level environmental sciences. It is an innovative partnership that involves Houston Community College, Contra Costa College, Southmost Community College, the University of California at Berkeley, and the Lawrence Livermore National Laboratory.

OFFICE: NUCLEAR ENERGY

Nuclear Energy HBCU Program

Audience: Undergraduate students

The Nuclear Energy Training Program is designed to assist students attending Historically Black Colleges and Universities through training, study, research participation, and academic enrichment of students and faculty.

OFFICE: CIVILIAN RADIOACTIVE WASTE MANAGEMENT

HBCU program

Audience: University faculty

The purpose of the program is to increase opportunities for HBCU involvement in federally sponsored programs. The HBCU program strengthens research and training capabilities of HBCUs through mission oriented scientific research with special focus on site characterization at Yucca Mountain, Nevada. Faculty fellowships are established to assist in enhancing HBCU infrastructure and make some changes in both the technical education programs and the teacher education programs.

OFFICE: FOSSIL ENERGY

Fossil Energy HBCU education and training

Audience: Undergraduate students

This is an annual grant program for the nation's 117 Historically Black Colleges and Universities to support fossil energy-related research and educational experiences for minorities. Activities include academic research projects and summer internships at DOE laboratories and technology centers.

Office: Economic Diversity

Minority Honors Training and Industrial Assistance Program

Audience: Undergraduate students

The Honors program is a nation-wide program in energy-related technologies at eight two-year colleges. Each of the institutions provides student assistance in the form of scholarships and special activities including role models and tutoring. Support is provided to the institutions to assist the development and expansion of link-

ages with industry. Student recruitment and retention are emphasized at each institution.

Minority Impact Comprehensive Program

Audience: Undergraduate students

This program is currently funding twelve institutions which have a 20 percent or more minority enrollment and have a history of graduating minority students in the fields of mathematics, computer science, the life sciences or engineering. The careers, enhance the quality and quantity of energy-related undergraduate research and training provided to minorities, and increase the pool of minority students that select graduate study in energy related disciplines.

Cooperative Developmental Energy Program

Audience: Undergraduate students

Since 1983, the Fort Valley State College in Georgia has received funding from DOE to implement an innovative energy education program that has increased the number of minorities and women working in the private and governmental sectors of the energy industry. Students interested in dual degree programs may apply for competitive scholarships up to $26,700 in Mathematics and Electrical Engineering with the University of Nevada at Las Vegas or in Mathematics and Chemistry/Geosciences with the University of Oklahoma.

Minority undergraduate training in energy related careers

Audience: Undergraduate students

This program provides grants to institutions with at least 25% minority enrollment to be used for student scholarships, summer research experiences, teacher training, and curriculum enhancement. It is designed to increase the quantity and quality of energy-related undergraduate research and training provided to minorities.

Minority Institutions Research Travel Program

Audience: Undergraduate and graduate students

The program provides funding for research related travel for persons conducting research at minority educational institutions.

Model engineering, science and mathematics curriculum enhancement project

Audience: Middle and high school students and faculty

This program was awarded to the Southeastern Consortium for Minorities in Engineering (SECME) to develop an educational and training program for middle and high school students, teachers, and school administrators in the District of Columbia Public Schools. The program's purpose is to increase the number of minority students who are academically prepared to enter college and complete studies in engineering, mathematics, and science.

Minority Technical Education Program

Audience: Undergraduate

This program provides grants to minority serving post-secondary, two-year educational institutions to increase the number of minorities in math and technical careers, increase the quality and quantity of energy related curricula, and establish partnerships with industry to promote economic growth and technology transfer in the community served.

OFFICE: ENERGY RESEARCH

Careers in applied mathematics

Audience: Undergraduate and graduate students

The Careers in Applied Mathematics Program, which received initial funding this year, is a joint program between Central State University and Ohio State University to develop an interest in computational science and applied mathematics among African-American undergraduate and graduate students by involving students in research projects during the academic year that are followed by summer visits to Department of Energy laboratories. At the laboratories (and indeed, throughout the year, thanks to high-speed networking capabilities) the students and their faculty mentors have access to powerful supercomputers and to some of the best computational scientists and applied mathematicians in the world, who are committed to minority education. One of the goals of the program is to encourage more African-

American students to pursue careers in science and work at the national laboratories upon graduation.

High performance computing and communications project

Audience: Undergraduate students

Under the auspices of the Science and Engineering Alliance the Office of Scientific Computing began funding this year an interdisciplinary program in high performance computing and communications that involves the four member HBCU's (Alabama A&M, Jackson State, Prairie View A&M and Southern Universities) and the Lawrence Livermore National Laboratory in collaborative projects centered around core HPCC and NII activities. Computational scientists and applied mathematicians at the five participating institutions will attack several grand challenge problems and develop the required algorithms and software tools needed in a host of Department of Energy application areas. The direct involvement of African-American graduate students in these research activities is a central part of the project, in the hope that many will make employment at the national laboratories a career goal.

Fusion Energy Historically Black Colleges and Universities Program

Audience: Undergraduate and graduate students

The Fusion Energy (FE) program has been supporting Historically Black Colleges and Universities (HBCUs) for over a decade. Starting with a couple of small contracts in the early 1980s, the programs have evolved into a multifaceted approach aimed at facilitating the integration of these untapped resources into the FE research efforts. In recent years, the Fusion program has funded several initiatives aimed at bringing HBCUs into research areas of relevance to FE. During the past five years, FE has provided $1,000,000 per year to these efforts. The major portion of these funds were utilized to support several Academic Alliances sponsored by the Office of Energy Research. The remaining funds were used by FE to initiate and support faculty/student participation at fusion facilities and to fund starter grants at selected HBCUs.

Hampton University graduate studies

Audience: Graduate students

Nuclear Physics supports several educational programs including the HUGS (Hampton University Graduate Studies) program, a 3 week internationally attended summer study located in a minority institution and which provides students with scientific lectures and hands-on experience at the nearby CEBAF accelerator. A second program, based at Argonne National Laboratory, supports scientific visits to HBCU and HACU institutions, to encourage qualified students to enroll in the Summer Research Participation Program and follow up with appropriate placement opportunities within the laboratory for scientific work experience.

Historically Black Colleges and Universities Biological and Environmental Research Program Faculty and Student Research Participation Program

Audience: Undergraduate students and faculty

The goal of the program, which was instituted in 1983, is to provide training and collaborative research participation opportunities in programs and activities supported by the Biological and Environmental Research (BER) program at designated U.S. Department of Energy (DOE) research and development laboratories. The goal is achieved by placing faculty and student participants at a BER supported facility for 10-12 weeks to perform research in ongoing projects. The program provides participants with a broader understanding of the BER program, its research mission and subcontracting system, and a mechanism for participants to quickly achieve state-of-the-art capabilities and training in health and environmental technologies for future research on a larger and more long term scale. It also forges necessary cooperative research and training linkages between HBCUs and BER facilities for encouraging ongoing collaborations and mentoring. Faculty can integrate their experiences into the curriculum and produce a better prepared workforce; students gain practical experiences that support the theories learned in the classroom; the host researcher obtains new perspectives, insights, and enrichment from the mentoring/advising; all contribute to the BER research mission in the process. In FY 1993, 18 participants were appointed, including six faculty, six graduate students, and six undergraduate students.

Environmental Biotechnology Program at Florida A&M University

Audience: Undergraduate, graduate students and faculty

The objectives of this project initiated in FY 1994 by BER are to enhance minority human resource development in the area of environmental sciences and engineering and to support new and promising environmental biotechnology research at Florida A&M University (FAMU). In addition, FAMU will involve the University of Florida, DOE National Laboratories, and other universities and environmental centers in advanced training of approximately 48 faculty and graduate students in the areas of radiation protection, environmental restoration, and waste management. The establishment of a fundamental core activity at FAMU will: (1) promote interdisciplinary research amongst FAMU faculty and with scientists and engineers from other institutions and (2) train students and postdoctoral fellows in environmental science and biotechnology. The core will, in turn, make strong contributions in research, the work force, environmental remediation and restoration, and the Nation's economy. Currently, less than four percent of the professional environmental work force are African Americans.

Global Change Education Program

Audience: Graduate students

During FY 1991, the Department of Energy (DOE) initiated a Global Change Educational Program (GCEP) to strengthen the human resource base in science and technology and to provide highly trained and educated individuals for advancing the cross-disciplinary science of global change. The major emphasis of this educational program has been to award competitive postdoctoral and graduate-level fellowships for training the next generation of scientists with the interdisciplinary skills necessary for conducting global change research. For FY 1995, the GCEP program will initiate faculty/student awards to strengthen science education at Historic Black Colleges and Universities (HBCUs) and to develop collaborative research ties between HBCUs and DOE laboratories on global change issues. Six HBCU faculty research/student education awards of $30,000 each will be provided in FY 1995 and will be renewable for up to four years. This award program will help both faculty and students at HBCUs to gain access to the state-of-the-art scientific equipment, to collaborate with the outstanding professional staff, and to become acquainted with the ongoing multidisciplinary research programs in global change that exist at DOE Laboratories.

Senator DOMENICI. Could you tell us for the record, any of you, but Jim, if you know with specificity, the effectiveness of this WERC program with reference to a curriculum and students getting involved in environmental engineering?

Dr. TEGNELIA. Yes, sir. I was in Las Cruces with Darrell Morgan, who I think you know, who is the dean of Engineering at New Mexico State, and with Ron Bhada, who runs the WERC program. There are several things which I would call to your attention.

The first thing is they have a very active education program. At any one time they have more than 300 people who are getting advanced education or degrees in education having to do with waste management activities. That represents about a third of the estimate of what we believe is necessary to increase the number of people working in that field.

They also have a very active research program which I think you are aware of, very much concerned about geological activities, how do you make use of what is generally considered today to be waste. For instance, they have a program which makes building materials out of flyash which is a byproduct of waste management. They have about 30 programs which are instituted at any one time, which is only about one-third of the nominations that are presented to them. So, they have a very vibrant program there.

They also have an exchange program with Mexico having to do with environmental remediation which is going to be very helpful in a NAFTA environment. So, they have been in existence, I think

as you know, since 1990. The first phase of their funding is completed in 1995. I think their track record has been excellent, and we certainly would like to support continuing that.

Senator DOMENICI. Are you aware of this program and do you support it?

Ms. RUMSEY. Not in as much detail, but I know that the Department is very interested in expanding our science education programs to include environmental and waste management.

Senator DOMENICI. I wonder, as part of your written response, if you would look into the WERC program and tell us for the record your evaluation of it at the Department.

Ms. RUMSEY. Absolutely.

[Subsequent to the hearing the following was submitted:]

The Department has not done a formal internal evaluation of the Waste- Management Education & Research Consortium. However, there was an external evaluation done by a Blue Ribbon Panel established by the Consortium on December 1, 1993. Following is a summary of the Panel's findings:

The educational programs have involved strong cooperation among the three universities in New Mexico as well as Navajo Community College. This cooperation includes joint work in providing education with students often taking courses from more than one university as they work on degrees in traditional fields with options in environmental sciences or engineering. The Panel strongly supported the initiative and urged that more consideration be given to the education areas outside of science and engineering which are important in the overall picture of environmental work. The Panel was particularly laudatory in its assessment of the impact of the environmental design contest.

The research and technology aspect of the program has made good progress. Some of the results are at the pilot scale phase and appear close to field implementation. The Panel suggested that a careful review be made of the funding provided by the Consortium to DOE laboratories specifically concerning certification issues. Regarding technology transfer, the Panel urged that a greater effort be spent on working more closely with industry to benefit from the technology transfer capability of industry, including the possibility of receiving additional financial support from industry as a result of this collaboration.

The Consortium has had a commendable educational outreach program to precollege schools and community-based organizations. The interactive TV programming that has been developed is very impressive, but the Panel noted with concern the costs of this effort and suggested that a thorough evaluation of these costs be initiated. All methods of outreach including new books and publications should be investigated.

In the report of the Panel several additional recommendations were presented. Specific among these are the recommendations that the mission statement of the Consortium be revisited and that a comprehensive strategic plan be developed. In this long-range strategic planning, various future financial scenarios should be considered, including one of less subsidy from external sources. The Panel believes that the Consortium has accomplished much in its first years. Nonetheless, a performance audit would be helpful in identifying any areas in which costs have been high and highlight improvement that can be made in future years.

Senator DOMENICI. Thank you, Mr. Chairman. Thank you all very much.

Senator Hatfield, it is a pleasure to be your original co-sponsor of this bill. I was very pleased to do that.

Senator HATFIELD [presiding]: I would like to indicate for the record that this idea was introduced in 1990 and the Senate passed a resolution. But, the House failed to act, so we looked for ways to launch the program other than that of public revenue. And we were fortunate to have the Triangle Coalition obtain from the John D. and Katherine MacArthur Foundation the money to support our first fellows here on the Hill.

As I indicated earlier, I want to stabilize the program because we have been sort of going year by year, as best we could piece together our resources and our support. I want to be very straightforward. I introduced this bill, as you have seen it, S. 2104, but I am going to substitute when we move to the markup. I am going to substitute another bill, that is, through an amendment, and that is merely to provide for two such fellows in the Senate, two in the House, and six in the agencies. We have identified the agencies and all of this is certainly open to your recommendations and your suggestions and others as well. We are not locked in concrete on this. We would have one from OSTP, NASA, NSF, NIH, Education, and Energy.

We are doing this because frankly I wanted the bill here in this committee for the markup, and unfortunately, the Parliamentarian made an error not sending the bill as we anticipated. So, we are introducing this amendment to what would have been the original bill if we had been able to go the route of parliamentary procedure that I wanted to follow.

I say that to you in order to give you an opportunity to indicate whether or not your support for 2104, as you have testified, would be supportive of the kind of amendment that I have outlined.

Ms. RUMSEY. Yes, sir, we would.

Dr. TEGNELIA. I agree, sir.

Dr. FOWLER. Yes, sir, very much.

Senator HATFIELD. Thank you.

Now, because it is to be housed in the Department of Energy—and I understand from your testimony, Dr. Rumsey, that you feel that the Department is an appropriate place to house it. You see this as part of the mission of DOE and you do not see any difficulties of having this combination of awardees to both the executive and legislative branches of Government and undergirded through a funding mechanism of a $550,000 authorization level.

Ms. RUMSEY. No, we do not.

Senator HATFIELD. So, we do not have any hangups there.

I want to also ask Dr. Tegnelia. Do you see any value to each of the fellows spending time in more than one national laboratory and then working together toward the end of the fellowship year to develop recommendations for the education programs?

Dr. TEGNELIA. Yes, sir, I do. I think all of the DOE laboratories have a different set of programs. They have a different set of core competencies that they specialize in, and I think that would broaden the individual recipient of the fellowships and make them aware of more opportunities that exist for them in the national laboratories.

Senator HATFIELD. There has been a very interesting feedback we have had from these fellows, particularly the ones with whom I have had a working relationship, and that is that when they return to their respective schools, they have not only found an opportunity to contribute here to the math/science questions and policies, but they have also gained an insight into the operations of the Federal Government. This interdisciplinary kind of result some of them are planning to teach and they have been asked by their colleagues to come and give lectures on Government process, Government procedure in the social studies area.

I think that is, frankly, a major plus in this whole effort because I am sure the younger generations to mine have had perhaps a different experience, but we used to look at those over in the science buildings and the math buildings as students who were headed for engineering and for medicine, and we in the social studies, political science in particular, were so much broader educated than those who were so narrowly educated over there in the sciences, to a great degree because we were not qualified to be in the sciences probably. But nevertheless, I think it is a very healthy thing to see this interdisciplinary exchange following this experience.

Do you have any comments on that?

Dr. TEGNELIA. Sir, the only thing that I would add is I think we also learn from that process. A lot of the insights that our visiting professors and teachers provide to us on how, first of all, to improve our education programs, but also our research programs make that effort well worth it to us as well.

Senator HATFIELD. Dr. Fowler, I understand that you have addressed the question that I had down here. Since you were Director of the Presidential Award for Excellence in Science and Mathematics Teaching, I was going to ask you to comment about that award being sufficient measurement in order to get a broad base of recipients and participants or a quantitative factor as well, would we have enough such awardees to draw from.

Dr. FOWLER. Well, we have not limited ourselves to that base. What we tried to do was find a quick way to target outstanding teachers, but we have gone to the Presidential awardees, to the Wilson Fellowship winners, to the winners of awards from the biology teachers and the chemistry teachers and so forth. So, we have looked broadly for award winners.

The Presidential awardee base does give you presently 3,000 Presidential awardees, and if you count what we call the State level awardees that are selected at the State level, they are adding about 600 a year. So, that is a big base of outstanding teachers to draw on.

Senator HATFIELD. We do want to have broad representation from minorities and women and so forth in this program. In fact, so far we are fortunate to have had diversity within the awardees, but I do not want to see a structure or criteria that tend to exclude. We want to be as inclusive as possible on this.

This is a very distinguished panel, but of course, there is a missing voice here today in this panel and that is the teacher who has participated in the congressional fellowship program. I am pleased that, Dr. Fowler, you have submitted testimony and statements from such persons because I think it is very important for the record.

I want to thank Senator Ford again as chairman of this subcommittee for his calling of this hearing. At this time I would submit for the record letters from the National Science Teachers Association, the National Council for the Teachers of Mathematics, the Triangle Coalition for Science and Technology Education, and the Oregon Department of Education.* These will add more information to our hearing and the record.

*See appendix.

Senator HATFIELD. Again, let me as the author of the bill indicate that I did not see this as a solution to our math/science problems, and I am very happy, along with Senator Kennedy, to have authored the math/science consortium program, of which we have the 10 consortiums across the country which are functioning very effectively. I have a bill I am hoping to finish up in this session to provide about $30 million a year for the next 4 or 5 years to produce hands-on equipment for all the elementary schools which are so deficient in many areas—just a microscope—let alone other such instrumentation to excite the interests of youngsters in the elementary level.

I also want to share with you an experience that we are experimenting with in Oregon. We have a continuing education institution focused on adult education but open from 7 a.m. to 10 p.m., 7 days a week for people to complete and get educational programs within their own schedules.

The director of this program who is also very concerned about math/science deficiencies has come up with a remarkable experiment of Head Start teachers. She has created an institute, two of them in the summer of 6 weeks each, and taking Portland and particularly the area where we have a concentration of Head Start programs. Most of these teachers are women. Most of these teachers are black. These teachers in their own educational experience by cultural attitudes and educational institutions have been intimidated to some degree at least in the math/science field. The president of Marylhurst has now created this institute and opening a whole new world to these teachers at Head Start level.

I sat through some of the program and I could just see the awakening of a new world, knowledge, information, excitement, enthusiasm, and these teachers going back into those Head Start classes infecting those students with a believable, understandable math/science dimension. I think that is very exciting because we thought secondary was too late, in many instances elementary perhaps is too late. I think at the Head Start level getting people interested in the math/science direction could bear great results in the future. If any of you happen to be in Portland sometime, you ought to visit Marylhurst because I think you will find that program working very well.

I understand that both Senator Ford, our chairman, and Senator Domenici may offer some follow-up questions. If you would respond at your convenience within 2 weeks to those questions, we would appreciate it very much. We will keep the record open for another 2 weeks for any additional testimony that anyone would like to submit. Once again, thank you very much for your contribution.

This session is adjourned.

[Whereupon, at 10:35 a.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

DEPARTMENT OF ENERGY,
CONGRESSIONAL AND INTERGOVERNMENTAL AFFAIRS,
Washington, DC, July 26, 1994.

Hon. Wendell H. Ford,
Chairman, Subcommittee on Energy Research and Development, Committee on Energy and Natural Resources, U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: On June 28, 1994, Terry Cornwell Rumsey, Director, Office of Science Education and Technical Information, testified regarding the establishment of a national Albert Einstein Distinguished Educator Fellowship Program.

Enclosed are the answers to the ten questions that you submitted.

If we can be of further assistance, please have your staff contact our Congressional Hearing Coordinator, Barbara Campbell, on (202) 586-6238.

Very truly yours,

WILLIAM J. TAYLOR III,
Assistant Secretary.

[Enclosures]

RESPONSES TO QUESTIONS FROM SENATOR FORD

Question 1. DOE his provided support for the Albert Einstein Congressional Fellowship Program in Fiscal Year 1994. How does DOE's support of this program further DOE's mission?

Answer. The development and implementation of science, mathematics and technology education programs are a major part of the Department of Energy's mission as authorized by Public Law 101-510, the "Department of Energy Science Education Enhancement Act of 1990." Specifically, "The Secretary is authorized to establish programs to enhance the quality of mathematics, science, and engineering education." Teachers play a critical role in the process of improving science, mathematics and technology education in this nation and the Department of Energy's support of this Congressional Fellowship Program is consistent with and furthers the Department's mission. As part of its effort to establish programs to enhance the quality of mathematics, science, and engineering education, the Department provided partial funding in the past for the Einstein Program along with other agencies. This effort is an incentive for science teachers who would like to have an opportunity to effect change. Such change is intended to address inadequate teaching conditions that exist in most school districts. Since 50% of the science teachers leave the profession within the first seven years, DOE's support is viewed as one way to reward teachers for their efforts and keep them in the profession. It is also important to recognize teachers in light of the fact that many schools do not reward accomplishments in science to the same extent that they recognize success in other areas, including extracurricular activities and sports.

Question 2. DOE administers the Interagency Summer Teacher Enhancement Program (STEP). Why was DOE selected to administer this interagency program?

Answer. The Department of Energy (DOE) was asked to administer this interagency teacher enhancement program on behalf of the Federal Coordinating Council on Science, Engineering and Technology (FCCSET), because of DOE laboratory expertise in teacher development programs. The Department coordinates activities associated with the Summer Teacher Enhancement Program, including the review process, training in teacher and program profiling, staff development based upon the

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best of research and practice, and evaluation and monitoring of Federal laboratory sites participating in the summer program.

An integral part of the Department's mission is to be a major partner in world class science and technology through the national laboratories. The Department was also asked to be the lead agency in this Summer Teacher Enhancement Program because of our expertise to help other Federal agencies build their own capacity to use their scientific laboratories and facilities for enhancing science education. All Federal agencies with scientific research laboratories and facilities have been eligible to apply to this program. Participating agencies have included the National Aeronautics and Space Administration, the Environmental Protection Agency, the Departments of Agriculture, Commerce, Interior and the Smithsonian Institution. This is the second year of the program.

Question 3. Witnesses at the hearing talked about expanding S. 2104 to create a program that would place fellows throughout the Executive and Legislative branches. Would giving DOE the responsibility to administer such a program be contrary to its mission responsibilities? Would it help further DOE's mission responsibilities? Would DOE be able to effectively administer such a program?

Answer. The proposed program of S. 2104 would complement the Department of Energy's overall mission in science, mathematics and technology education as I previously noted. Since teachers are critical to the process of improving science, mathematics, and technology education, this program could also be helpful in furthering DOE's mission responsibilities to use its unique research resources in this effort. The Einstein fellowship program would specifically complement our existing Teacher Research Associates Program. This program already provides leading-edge research opportunities for teachers for an eight-week period at 27 DOE facilities nationwide. We do recommend that S. 2104 clarify that the fellows would not be federal employees.

With the movement toward year-round schooling, the Einstein Fellowship Program would fill an important niche created by this trend. The Department has the institutional experience to administer the program effectively.

Question 4. How many teachers have participated in DOE fellowship programs? How many students have been impacted by these programs?

Answer. Number of teachers involved in DOE programs:

Program	Approximate No. of Teachers/Year	Approximate No. of Students/Year taught by these teachers
Teacher Research Associates Program (TRAC)	400	4,000
NSTC Summer Teacher Enhancement Program (STEP)	600	6,000
Local Programs for Teachers at DOE Laboratories and Facilities	30,000	900,000

Question 5. Should the fellowships called for in S. 2104 be for an academic or for a calendar year? Please explain the costs and advantages and disadvantages to both.

Answer. As the school year now exists, I believe the fellowship should be for the academic year. Teachers need time to assimilate and structure the research experience for classroom use. By giving them the summer prior to classroom reentry to "make meaning" out of their research experience, teachers would be more effective. The difference between a full year and an academic year would not affect the cost.

Question 6. S. 2104 would limit the fellowship program to outstanding teachers who have made a contribution to energy conservation. Should the program be limited just to teachers who have made a contribution to energy conservation?

Answer. Energy Conservation is very important, but too narrow of a focus. We would suggest that all areas of energy science and technology be eligible.

Question 7. S. 2104 defines the term outstanding. Is it necessary to even define the term outstanding? If so, is there a say to define the term so as not to exclude teachers who, while not meeting the established criteria set forth in the bill, would nonetheless be considered outstanding?

Answer. We believe it is necessary for the proposed legislation to define how teachers should be selected and what criteria should be used. However, the legislation as currently proposed, defines 'outstanding' too narrowly. Of particular concern is that teachers who teach large populations of underrepresented students in science, mathematics and technology fields also be considered. Outstanding could be

defined are generically in terms of characteristics rather than recipients of specific award programs. Such criteria could include qualities as leadership skills, for example teachers who have demonstrated abilities to be change agents in their school districts. These teachers would not only be effective in the classroom, but also would be effective in the community.

Question 8. What kind of selection process should be put in place to decide who should be awarded fellowships? Who should set up the process? Who should administer the process? Who should actually decide which teachers should be awarded a fellowship?

Answer. The Department of Energy through one of its contractors would establish and administer the process. This process would be two-tiered. Rating scales and criteria would be made available to teacher applicants. Applications would first be reviewed by panels of other teachers. Once this panel has made the initial cut, successful applications would then be forwarded to the research laboratories for placement recommendations. After reviewing the recommendations from the panel and the laboratories, the Department, through my organization would make the final selection. The first application cycle would create a pool of participants for the initial three years of the program.

Question 9. The bill authorizes the Secretary of Energy to hire a contractor to administer the program. Is this needed? Could DOE use one of its existing laboratories or its own staff to administer this program or does S. 2104 need to authorize the use of a contractor.

Answer. It would not be necessary to hire an outside contractor. Our past policy has been that we have used the assistance of one of the Department's laboratories or university consortia to administer large programs. As an example, the Associated Western Universities, which administers the Teacher Research Associates Program, could integrate this into its current responsibilities.

Question 10. What kind of evaluation mechanisms should S. 2104 require in order to monitor whether the program is being successful?

Answer. The evaluation mechanism constructed by the National Center for Improving Science Education in cooperation with Department of Energy National Laboratories for teacher research experiences, as well as teacher development programs could be used with modifications. The mechanism contains templates which compare the best in research and practice with what actually transpires during the research participation process. It would be necessary to have a clear statement of purpose and goals for the Einstein Fellowship program to determine the appropriate evaluation mechanisms.

RESPONSES TO QUESTIONS FROM DR. JAMES S. TEGNELIA

Question 1. Witnesses at the hearing talked about expanding S. 2104 to create a program that would place fellows throughout the Executive and Legislative branches. Would giving DOE the responsibility to administer such a program be contrary to its mission responsibilities? Would it help further DOE's mission responsibilities? Would DOE be able to effectively administer such a program?

Answer. As the O&M contractor managing Sandia National Laboratories, we are not in a position to define what may or may not be contrary to the DOE mission. However, we do support DOE programs, including those in education outreach. On that basis, we believe that giving DOE the responsibility to administer the S. 2104 fellows program will enhance the DOE initiatives to improve science and mathematics education and to ensure the development of a diverse, technically trained hiring pool. DOE has demonstrated its capability to effectively administer such a program through the existing teacher enhancement programs in place at the DOE laboratories. DOE and its laboratories also work closely with other federal departments and agencies, such as the Department of Commerce, the Department of Defense, and the Department of Transportation.

Question 2. Should the fellowships called for in S. 2104 be for a academic or for a calendar year? Please explain the costs and the advantages and disadvantages to both.

Answer. We recommend that the fellowships should extend for a full calendar year. This will allow the fellows to become more deeply involved in the work at their assigned laboratories or other organizations and strengthen the networks that they will be forming. The fellows will thus be present during the spring and summer months, when program and budget formulation are in their most active period. Extending beyond the academic year would also allow the fellows to participate in and contribute to the summer teacher workshops operated by the laboratories. From our experience with the DOE Masters program, we feel strongly that a full year is

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required for the teachers to become completely involved in a scientific team and then maintain their new relationships when they return to their schools.

Question 3. S. 2104 would limit the fellowship program to outstanding teachers who have made a contribution to energy conservation. Should the program be limited to teachers who have made a contribution to energy conservation?

Answer. I believe we are interested in attracting applicants who are excellent teachers, who have excited their classes by teaching and demonstrating current technological advances or by addressing the technological aspects of current national concerns. The criteria should emphasize developing outstanding school or community programs and inspiring students in their scientific or technological education. The focus of these teacher-developed programs and student training should be on current, relevant national issues, such as energy security, sustainable development, information highways, etc. Thus, the criteria could be related to actual programs the teachers have started and to visible results from their students in science fairs or continuing their education. "Contributions to energy conservation" also ignores significant parts of DOE's overall work and would limit coordination with other federal departments.

Question 4. S. 2104 defines the term outstanding. Is it necessary to even define the term outstanding? If so, is there a way to define the term so as not to exclude teachers who, while not meeting the established criteria set forth in the bill, would nonetheless be considered outstanding?

Answer. I suggest that the criteria noted in Question 3, above, be used with no other caveats. These criteria will identify outstanding and effective teachers for this program. The criteria in the current language of the bill effectively eliminate teachers in rural areas, many of whom are working with minority students. This is particularly true in states that are largely agricultural and those with large Native American, Hispanic, or Black populations.

Question 5. What kind of selection process should be put in place to decide who should be awarded a fellowship? Who should set up the process? Who should administer the process? Who should actually decide which teachers should be awarded a fellowship?

Answer. The selection process could be similar to that already in place for such DOE teacher participation programs as TRAC (Teacher Research Associates). I would suggest that participating agencies and laboratories set up a selection process under the guidance and concurrence of appropriate DOE personnel from the Office of University Science and Education. The participating laboratories' education outreach organizations could both administer and select the teacher participants, while ensuring that all teachers have an equal opportunity to be considered.

Question 9. The bill authorizes the Secretary of Energy to hire a contractor to administer the program. Is this needed? Should DOE use one of its own laboratories or its own staff to administer the program or does S. 2104 need to authorize the use of a contractor?

Answer. If the bill in its final form designates DOE as the responsible agency, then the department should have the authority to administer the program in the most cost-effective way. Options available for administering the program include direct management by DOE, using one or several DOE laboratories to manage the program, involving an existing DOE education group or program (such as WERC, an active DOE university-driven program), or contracting to a third party.

Question 10. If a fellowship program that would place teachers into fellowships throughout the Executive and Legislative branches were to be established, which agency should administer that program? Would DOE be a good agency to administer such a program?

Answer. DOE certainly has the capability to administer a teacher fellowship program established for the Executive and Legislative branches. The overall program management processes should be independent of the assignments of the fellows. We do need to ensure that such assignments would not present any conflicts of interest or result in political pressures on the administrator or the fellow. I do not believe that this would be a problem if potential conflict of interest issues are addressed in the overall charter and bylaws of the fellowship program.

Question 11. What kind of evaluation mechanisms should S. 2104 require in order to monitor whether the program is being successful?

Answer. The evaluation mechanisms would depend on the goals of the program, which have not yet been clarified. The administrator of the program could be tasked to define specific metrics and the methods to obtain them. DOE, with its TQM experience, would be in a good position to develop the quality metrics. Based on our experience with the Masters program, I suggest that the goals and associated metrics could include:

Education of the teacher on processes of government related to science and technology, or on technological advances that can be taken back to the classroom. Metrics would be related to actual application of this knowledge in the classroom.

Education of the organizations where fellows are assigned on the needs of professional educators and on the best methods to support the organizations' education outreach efforts. Metrics could include increased involvement of government or laboratory personnel in local school systems.

Development of government-education networks for enhancing math and education. Metrics might include the number of new schools or teachers utilizing the knowledge brought back by the fellow.

If the fellows were selected regionally, the regional selection groups could do the reviews, based on requirements and guidance defined by DOE. The regional results could be presented to this Committee and updated each year. Alternatively, DOE could choose to implement an independent program review. (Our experience with education programs is that approximately 10% of the program budget is required to support an independent program evaluation.)

RESPONSES TO QUESTIONS FROM ROBERT W. HUTCHISON

Question 1. Witnesses at the hearing talked about expanding S. 2104 to create a program that would place fellows throughout the Executive and Legislative branches. Would giving DOE the responsibility to administer such a program be contrary to its mission responsibilities? Would it help further DOE's mission responsibilities? Would DOE be able to effectively administer such a program?

Answer. The Triangle Coalition believes that the Department of Energy (DOE) is an ideal agency to bear program authority for S. 2104. DOE's responsibilities in support of science education have been clear for a number of years. It was upgraded and broadened by the Congress in 1990 to become one of the strongest among the mission-oriented agencies. This program does not broaden the agency's mission. We believe it complements the agency's vision to "use its unique resources . . . to maintain long term systemic reform of science and mathematics education."

The Einstein Fellowship program would provide a specific, unique and sharp focus to the agency's commitment to provide leadership in scientific and technical education. In light of the agency's current program in science education we believe that the agency will be able to effectively oversee this program, particularly if the services of a qualified contractor are used as is permitted in the current draft of the legislation.

Question 2. Should the fellowships called for in S. 2104 be for an academic or for a calendar year? Please explain the costs and the advantages and disadvantages to both.

Answer. Many teachers, particularly outstanding ones, have summer commitments that are extensions of their teaching activities during the 9-month academic year. These summer activities include curriculum planning and in-service education. For these teachers a nine- or ten-month fellowship might be preferable to a full year. On the other hand many teachers would welcome the opportunity to make a full year commitment to working in the Congress or in an Executive agency. My personal view is that the legislation should specify 12-month fellowships with the option of reducing the term to ten months in special cases.

Teachers of the caliber to be Congressional fellows have salaries averaging around $4,500 per month. Hence a 10-month fellowship would cost about $45,000 and a 12-month one $54,000.

These stipends are exclusive of fringe benefits. Some teachers in the past have been able to have these benefits paid by their school systems during their fellowships. Others have had to pay their benefits out of their fellowship compensation.

Question 3. S. 2104 would limit the fellowship program to outstanding teachers who have made a contribution to energy conservation. Should the program be limited just to teachers who have made a contribution to energy conservation?

Answer. Of all the outstanding teachers that I have had personal contact with over the past decade through the Presidential Award program I suspect that only a small percent have been actively engaged in energy conservation. Many have been involved in community service, service to their profession through local and national leadership in science and mathematics teachers organizations and professional societies, curriculum development and concerns for increasing the public's understanding of and appreciation for science—all important factors in judging a teacher to be outstanding.

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I believe it would be unfortunate to make "contribution to energy conservation" the sole or even the major criterion for awarding a fellowship; it delimits unnecessarily.

Question 4. S. 2104 defines the term outstanding. Is it necessary to even define the term outstanding? If so, is there a way to define the term so as not to exclude teachers who, while not meeting the established criteria set forth in the bill, would nonetheless be considered outstanding?

Answer. Since the Triangle Coalition Congressional Fellowship program began, we have defined outstanding teachers as those who have been recognized for exceptional contributions to science and mathematics education by fellow teachers and administrators. These include teachers who have received state recognition by the National Association of Biology Teachers and the National Council of Teachers of Mathematics, have been appointed Woodrow Wilson fellows in mathematics or chemistry, or who have received national Presidential Awards for excellence in science or mathematics teaching.

There are certainly many teachers of the caliber of these awardees who just missed receiving awards. I believe provision should be made to include them in the list of potential candidates. This could be done by including in each announcement of the fellowship program a statement of the criteria that will be used in judging an applicant's qualifications for a fellowship so a potential applicant could decide whether he or she meets the criteria.

Question 5. What kind of selection process should be put in place to decide who should be awarded a fellowship? Who should set up the process? Who should administer the process? Who should actually decide which teachers should be awarded a fellowship?

Answer. I believe the selection process should involve representatives of the academic community who are experienced in judging the quality of teachers' contributions to their profession and their communities, and also representatives of the government who can judge the candidates' potentials for making significant contributions to the Legislative or Executive agencies during their fellowships.

The selection process should be agreed on mutually by representatives of the academic and government communities. Since professional science and mathematics organizations are already well placed to identify potential candidates, I believe that such an organization should administer the process. However, representatives of both the academic and government communities should collaborate in making the final selections.

A process that has worked well for us over the past four years is to submit applications to a screening committee who agree on a group of ten or so finalists (for four fellowships). The finalists are then brought to Washington for interviews by a selection committee which picks the winners.

Question 9. The bill authorizes the Secretary of Energy to hire a contractor to administer the program. Is this needed? Should DOE use one of its own laboratories or its own staff to administer the program or does S. 2104 need to authorize the use of a contractor?

and

Question 10. If a fellowship program that would place teachers into fellowships throughout the Executive and Legislative branches were to be established, which agency should administer that program? Would DOE be a good agency to administer such a program?

Answer. As provided by S. 2104, the fellows will work in the Congress as well as in a number of Executive agencies, including the DOE. It seems to me to be desirable to have the day-to day operation of the program carried on under a contract administered by DOE. I believe an independent contractor is preferable since it would remove any implication that DOE could be charged with or in any way give the appearance of a conflict of interest in placing DOE fellows in other Executive agencies and in the Congress.

I suggest further that this contractor be a (not-for-profit) science, mathematics and/or technology education organization. The reasons for this are straightforward. Potential candidates for the teacher fellowships are already acquainted with educational organizations and feel comfortable working with them. An educational organization provides a special degree of credibility to the program. Also an educational organization has ready access to the communication channels that exist in education media, an important feature in publicizing the program.

Question 11. What kind of evaluation mechanisms should S. 2104 require in order to monitor whether the program is being successful?

A two-pronged evaluation process would be useful to determine the effectiveness of the fellowship program. First, the contributions of each fellow to the Executive

or Legislative processes can be determined by the supervisors and co-workers of each fellow. In addition, each fellow should submit an evaluation report at the termination of the fellowship program. These accounts would provide an immediate evaluation of the success of the program.

A second part of the evaluation would come after the fellow has returned to his or her school; a fellow's experience in Washington should carry over to his/her academic life. This would include educating other teachers about the nature of the legislative/executive processes and interesting them in becoming engaged in local government activities; and particularly in weaving Washington experiences into classroom science, mathematics or technology teaching. This would contribute significantly to developing public understanding of science and of the relation of science to social processes. Making this second part of the evaluation of the fellowship program would require periodic reports from each fellow, for say 5-7 years, after returning to academic work.

APPENDIX II

Additional Material Submitted for the Record

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS,
February 8, 1994.

Hon. Mark O. Hatfield,
U.S. Senate, Washington, DC.

DEAR SENATOR HATFIELD: The National Council of Teachers of Mathematics (NCTM), an organization with over 110,000 members dedicated to improving mathematics education, supports the goals and objectives of the Albert Einstein Outstanding Educator Fellowship Act which will provide ten fellowships for mathematics and science teachers from either the elementary or secondary level. We believe that having experienced classroom teachers serving as fellows in the Congress, the Departments of Education and Energy, the National Institutes of Health, the National Science Foundation, the Office of Science and Technology Policy, and the National Aeronautics ad Space Administration, will promote understanding and communication of mathematics and science education. Mathematics and science teachers will be able to provide others with first-hand knowledge and experiences of teaching children and teenagers these subjects.

We look forward to continuing to work with you and the Congress to improve mathematics education.

Sincerely yours,

RICHARD LONG,
Government Relations Specialist.

OREGON DEPARTMENT OF EDUCATION,
Salem, Oregon, January 26, 1994.

Hon. Mark O. Hatfield,
U.S. Senator, Hart Office Building, Washington, DC.

DEAR SENATOR HATFIELD: Thank you for your efforts to create a fellowship program for outstanding mathematics and science teachers that draws attention to the critical need for excellence in mathematics and science instruction, particularly at the elementary and secondary level. I wholeheartedly support the bill.

The Einstein Distinguished Educator Fellowship bill provides an opportunity for ten distinguished teachers to contribute their knowledge and skills to the work of the federal government. The fellows would bring a fresh perspective based on an intimate understanding of the world of the classroom to their work as fellows.

As I reviewed the draft of the bill, I noted the similarity between the proposed Einstein Fellows program and our own Distinguished Oregon Educator program. The Oregon Educational Act for the 21st Century calls for the Oregon Department of Education to bring six outstanding teachers to Salem each year to work with their educational colleagues across the state to reform and restructuring our schools. Because of those outstanding educators' credibility with teachers in the field, they are able to stimulate a fresh look at old practices. We have found their enthusiasm inspiring to the staff at the Department, and they certainly bring the reality of the classroom into our policy discussions.

Our experience in Oregon has been so beneficial, I am confident that a similar program at the federal level would prove equally rewarding to the fellows and to staff.

Let me again express my enthusiasm for this proposal; if I can help advance the bill, please let me know.

Sincerely,

NORMA PAULUS,
State Superintendent of Public Instruction.

TRIANGLE COALITION FOR SCIENCE AND TECHNOLOGY EDUCATION,
February 9, 1994.

Hon. Mark O. Hatfield,
Hart Senate Office Building, Washington DC.

DEAR SENATOR HATFIELD: The Coalition has followed with great interest the development of your bill "to establish a national Albert Einstein Distinguished Educator Fellowship Program for outstanding elementary and secondary mathematics and science teachers." We understand that the bill is now complete and that you will be introducing it soon to the Senate.

Your bill has our strong endorsement. As you know we have worked closely with the secondary school science and mathematics teachers who have served as fellows in the Congress during the past four years. The teachers presence on the staffs of Members of Congress and of Congressional committees has, we believe, provided fresh viewpoints to the legislative process. Their experiences have certainly broadened their knowledge of and interest in the legislative process and made an outstanding contribution to education legislation.

We have heard from most of the teachers after they have returned to their schools following their fellowship periods. They have all spoken enthusiastically about their experiences and have told of their continued involvement in public affairs.

We will be pleased to contribute whatever will be useful to assure passage of the bill.

With best personal regards,
Sincerely,

JOHN M. FOWLER, PH.D.,
Executive Director.

NATIONAL SCIENCE TEACHERS ASSOCIATION,
Arlington, VA, February 9, 1994.

Hon. Mark O. Hatfield,
U.S. Senate, Hart Senate Office Building, Washington, DC.

DEAR SENATOR HATFIELD: At the recent National Science Teachers Association (NSTA) Board of Directors' meeting a motion was passed in which the Board unanimously supported legislation in support of Einstein Fellowships.

NSTA has in the past supported Einstein Fellowships. Past recipients have been very instrumental in participating in the legislative process in Congress. These Fellows have also become very active within our association, and others, in involving and informing other educators about the legislative process. It is our understanding that the new proposed legislation expands the use of Eisenhower Fellows to several government agencies. We at NSTA support this activity because these agencies have demonstrated their active involvement in science education.

We would be most willing to circulate information about the Einstein Fellowships to our members through our publications.

Sincerely,

GERRY M. MADRAZO,
President.

IMPACT OF THE CONGRESSIONAL FELLOWSHIPS ON THE SCIENCE AND MATHEMATICS TEACHER RECIPIENTS

(Comments From Some of the Congressional Fellows)

Erma Anderson (1990-91, Senator Arlen Specter)

My year as a Congressional Fellow provided me with a clear vision and in a position to guide the changes that are taking place locally and nationally. Since I have returned to teaching I have . . . [become a] member of Pennsylvania Department of Education Rural Schools Liaison Task Force . . . Member of Science Task Force of the National Council on Standards and Testing . . . Member of Pennsylvania Department of Educations committee to write student learning outcomes in Science and Technology . . . [and several others.]

I am grateful for my experience as a Congressional Fellow and the opportunities provided. Paraphrasing . . . Robert Frost . . . "do not follow where the path may lead, go instead where there is not a path and leave a trail." The Congressional Fellowship facilitates this.

Arthur Lebofsky (1990-91, Senator Jeff Bingaman)

After 23 years with one suburban New York City school district as its high school science department chairman, I was attracted, in part due to my fellowship experience, to shift to a nearby district that is one third minority. . . . One of my DC experiences was to represent Senator Bingaman at meetings of Quality Education For Minorities, Inc. (QEM), and it was there that my concern for underrepresented minority and female science education became developed. I recommitted myself as a science educator to improve these opportunities. . . .

The Albert Einstein Fellowship, and my work with the Triangle Coalition, enabled me to proceed with confidence, new contacts, and knowledge of resources to help children obtain a quality science education. . . .

We . . . have more students entering academic and scholarship contests and receiving awards than ever before. Contacts with NSF, QEM, industries and colleges all made during the fellowship year have helped toward these ends.

Steve Boyarsky (1991-92, House Subcommittee on Elementary, Secondary, and Vocational Education)

The Einstein Congressional Fellowship has been a wonderful experience for me . . . I now fully realize the importance of policy decisions, leadership, and funding to proper functioning of schools. I have an understanding of the process of legislation, not the textbook flow chart, but how laws are developed and passed. I plan to be more involved in the political process within Oregon.

Betty Gasque (1991-92, Senator Jeff Bingaman)

On the whole, I feel that the Fellowship year in Washington was a wonderful learning experience. I certainly know a great deal more about educational issues at the Federal level and feel that I can be a good resource person in my state as we pursue various mathematics and science initiatives.

. . . the time spent working in Congress provided insights into public policy making which could not have been gained otherwise. . . . Important lessons included the need to constantly seek ways to mesh divergent views and to remember that compromise is essential.

Many opportunities have occurred which have enabled me to use knowledge gained during the fellowship year. These include work on state education committees and speaking opportunities to advocate a greater role for technology in education.

Patrick Canan (1992-93, Senator Mark Hatfield)

While still a novice on the Hill, in Oregon I'll be able to give valuable advice to my professional organizations as to how they can be effective advocates for education. . . . My students will also hear civics mixed in with lessons on physics. . . .

. . . professional renewal has been a principal benefit of this experience. After 23 straight years of teaching, this radically new environment and the chance to visit with educators and policymakers at all levels from the classroom to the White House, has rekindled my enthusiasm for trying out new strategies in my own teaching.

INVOLVEMENT OF THE CONGRESSIONAL FELLOWS IN THE LEGISLATIVE PROCESS

(Examples From Their Final Reports)

Arthur Lebofsky (1990-91, Senator Bingaman)

". . . Ray [Rameriez] and I have created four bills which were evaluated by legislative counsel. . . . The creation of a National Education Property Board to disperse surplus or excess Federal property to educational institutions . . . a bill to create a National Commission on Education Standards. This would emphasize the need to generate education standards (i.e. what a child should know and be able to do) before national tests are created. . . . Our goal is to slow the process down and develop a reasonable set of standards or expectations prior to testing.

"The Equalization in Education Act we are proposing was worked out in concert with Bruce Leslie of Congressman Coleman's office and is based on legislation which did not move last session. The anticipated goal is to equalize the funding of education within states for all children of the state. And, finally we generated a bill which would increase the paperwork and funding constraints on proprietary schools. Their accreditation standards would be toughened so that the unethical few could no longer prey upon the dreams of students seeking to learn a trade. These amend-

ments to the Higher Education Act will probably find their way into an omnibus reauthorization bill."

June Yamashita (1990-91, Senator Hatfield)

"I am attaching a 'Legislative Accomplishments' report . . . That digest will . . . offer the reader a sense of the scope—and the legitimacy—of legislative work I have been able to accomplish in the United States Senate as an Albert Einstein Congressional Fellow." (Legislative Accomplishments list attached.)

Steve Boyarsky (1991-92, Congressman Dale Kildee)

"Following my contributions to the committee report on H.R. 4383, I was asked to do some background work in framing the issues for potential legislation of technology in education. I read reports, talked to experts in technology, discussed possible proposals, identified states working with technology, and wrote a report to the subcommittee staff identifying the major issues of technology in education."

Betty Gasque (1991-92, Senator Bingaman)

"I wrote part of the legislation for this ['Ready-to-Learn' Public Broadcasting channel] amendment and also wrote part of the Senator's floor speech to introduce the amendment."

Althea Pearlman (1991-92, Congressman Howard Wolpe)

". . . I helped gather support in the House to prod the administration into implementing the Pollution Prevention Act of 1990. Although this act had been passed unanimously in both houses and had broad support from both industry and the environmentalists, the Office of Management and Budget blocked its implementation by rejecting the EPA's proposal for the "rule" (telling the industry how to comply.) Kate English, Congressman Volpe's Legislative Director, and I spent almost a week on the telephone garnering 125 representatives' signatures on a letter to Richard Darman, Director of OMB, asking him to reconsider his position. It was months and much work before a temporary compromise was found."

Patrick Canan (1992-93, Senator Mark Hatfield)

"As a staff member in Senator Hatfield's office I've been involved in the education-related legislative initiatives of the senator, particularly those relating to math and science. The specific legislative areas in which I've worked have been preparing for resubmission two bills from the 102nd Congress, the Elementary Science Equipment Act, and the Educational Flexibility Act. I have also researched and compiled the text and supporting documentation for the 7th Education Goal for building parent partnerships with schools. I've prepared amendments for the Labor Committee on Goals 2000, and have rewritten some as amendments to be introduced when the bill comes to the floor. Finally, I've incorporated several of Senator Hatfield's initiatives in math/science education in reauthorization legislation for Eisenhower, including a pilot program, Science Start, that will provide training in sciences to Head Start teachers."

FUNDING HISTORY OF THE CONGRESSIONAL FELLOWS PROGRAM

1990-91	(Fellows: Anderson, Lebofsky, Phillips, Yamashita)
$150,000	John D. and Catherine T. MacArthur Foundation
30,000	Triangle Coalition for Science and Technology Education
1991-92	(Fellows: Boyarsky, Gasque, McCaughan, Pearlman)
$75,000	John D. and Catherine T. MacArthur Foundation
65,000	Triangle Coalition for Science and Technology Education
40,000	U.S. House of Representatives
1992-93	(Fellows: Anderson-Nielsen, Canan)
$48,500	John D. and Catherine T. MacArthur Foundation
90,000	U.S. Senate
1993-94	(Brent, Leitch)
$24,500	National Institutes of Health
52,000	National Aeronautics and Space Administration
50,440	U.S. Department of Energy

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